This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

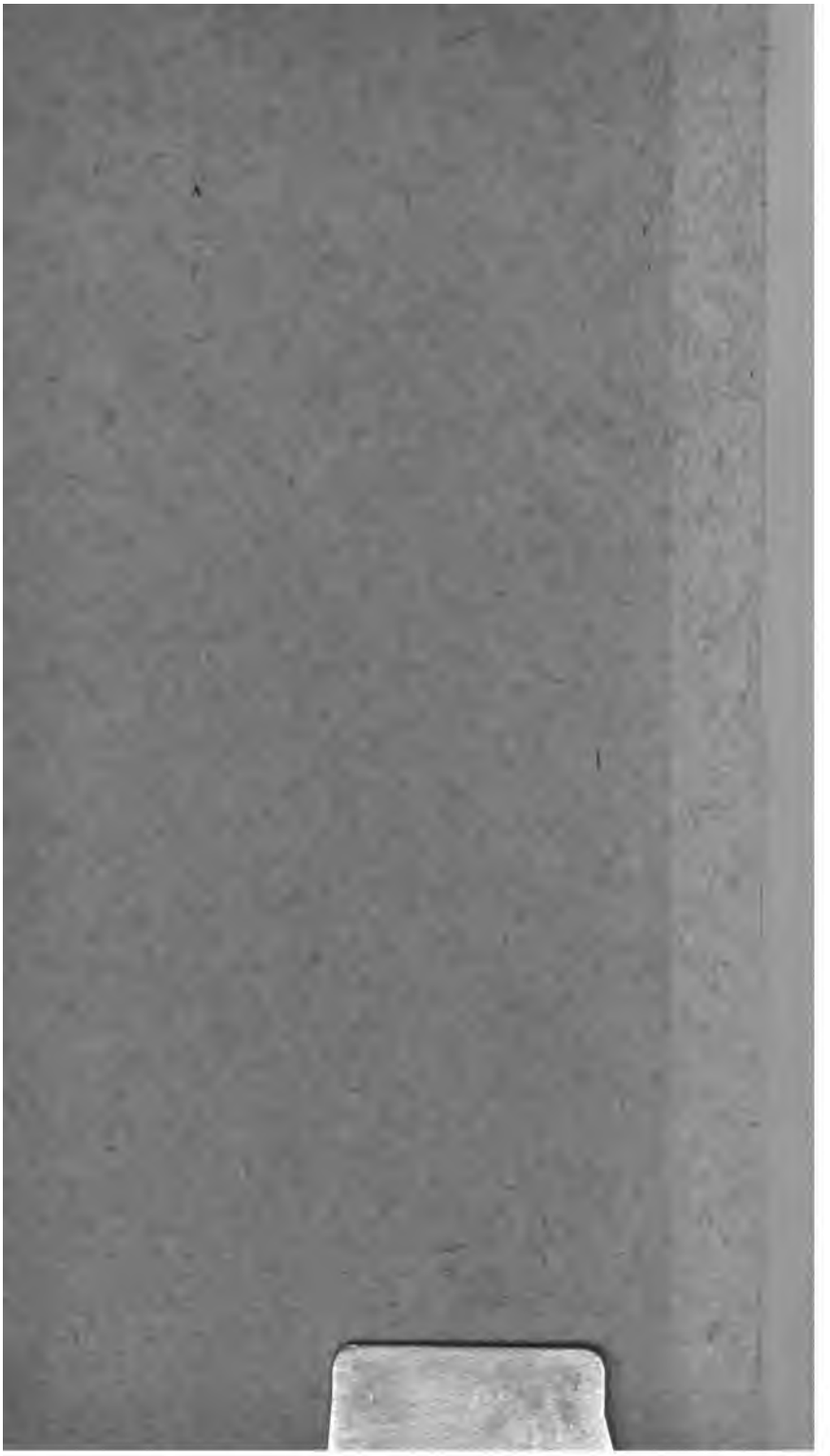
+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

3 3433 07597436 4



5 OF 6

THE

SANITARIAN.

A MONTHLY MAGAZINE

DEVOTED TO THE

PRESERVATION OF HEALTH, MENTAL AND PHYSICAL CULTURE.

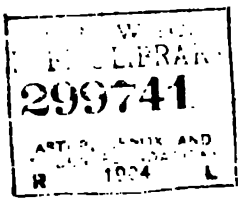
VOLUME LII., JANUARY TO JUNE, 1904.

A. N. BELL, A.M., M.D., Editor.

T. P. CORBALLY, A.M., M.D., HARRY KENT BELL, M.D., } Associate Editors.

BROOKLYN-NEW YORK, N. Y.: A. N. BELL.

1904.



Entered according to Act of Congress, A. D. 1904, by A. N. BELL, in the office of the Librarian of Congress, at Washington.

THE SANITARIAN.

JANUARY, 1904.

NUMBER 410.

OUR HOMES AND OURSELVES.

By A. N. BELL, A.M., M.D.

In the history of the effort to civilize the American Indians, it is recorded of an Indian agent in the Northwest, many years ago, that he built a number of farmhouses for the Indians in his jurisdiction which he persuaded some of them to occupy. Not long thereafter he had occasion to leave his post for a season, but with much self-gratification for the progress he had made in civilizing his wards. On returning to his charge, after a protracted absence of a little less than two years, he was greatly astonished at finding the dwelling houses he had built for them in use as storehouses only for their farming implements, and the Indians again in their well-aerated wigwams round about. On inquiry for the reason they informed him that all who slept in the houses were made sick, and some of them had spit blood; on removing to their wigwams they had regained their health and wanted nothing more to do with the white man's houses.

The Indian agent's effort to house the Indians is a good illustration of the continued but fruitless effort of cultured people generally, in all ages, to establish a correlation of the antagonizing forces of impure air and the maintenance of health. Insomuch that, as between our homes and ourselves, it is difficult to determine which is the more esteemed. Perhaps the proposition should be our homes *or* ourselves—it would be easier to show how prone people are to sacrifice their health to the economy of air space and sunlight.

No one can be thoroughly well and able to maintain resistance to disease without a plenary supply of fresh air and sunshine. For these agents there is no substitute. For various conditions the necessary areas of air space for occupation are variable. But evidently from common knowledge of the facility with which the air in confined places is deteriorated by breathing and of the difficulty

of renewing it, as taught in the schoolbooks, *no* room of less than 1,000 cubic feet occupied by one person only, can be effectively ventilated in cold weather—allowing for temporary suspension of ventilation in times of necessity—without danger to health. (Hospitals, barracks, prisons, workshops, assembly halls, etc., require from three to five times as much.) Large rooms, however, possess an advantage over smaller in that the change of air is effected with less perceptible motion, that is—with less draught. For example the admission of 3,000 cubic feet of air per hour into a room of 1,000 cubic feet involves a complete change of air in twenty minutes, but in a room of 10,000 cubic feet only once in 200 minutes, or for four occupants every five and every fifty minutes, respectively. The former would be very distinctly felt, and the latter would be scarcely perceived.

For these reasons it is evidently more difficult to provide for the efficient ventilation of a small room than for a large one, the air-space per head being the same in each case.

The bane of those who tolerate confined air is a *draught.* It is chiefly dangerous, like exposure to the ordinary vicissitudes of weather, to those who have had their power of resistance impaired by confinement, and particularly to the occupants of small bedrooms, because such persons, on account of the otherwise *still* air which they conserve, are much more sensitive to air currents. And herein lies one of the most troublesome problems the medical practitioner is called upon to solve, how to effectually warm and ventilate a small bedroom for the "lying-in" woman without draught.

Small bedrooms—that is to say those which afford less than 1,200 cubic feet to the occupant, particularly if used as lying-in chambers—should wholly rely upon the bed and clothing for warmth, unless, perhaps, heat can be admitted from an adjoining room. Ventilation without draught, in such circumstances, is no more difficult than for larger rooms. Rooms of less than 1,200 cubic feet capacity cannot be effectually warmed and ventilated in cold weather without thorough air flushing; and this can rarely be effected while they are occupied. Hence such rooms should be occupied by healthy persons as sleeping rooms only; never occupied as lying-in rooms or used by other invalids who cannot vacate them daily for thorough aeration.

Doubtless disease is often the result of draught—that is to say—of the passage of a current of cold air sharply across or against a portion of the body that is exposed to it; but the danger of this

is greatly enhanced by too close confinement. Persons who habitually expose themselves to an abundance of fresh air rarely suffer from such causes. Some there are, however, on account of apparently inexplicable reasons, who are supersensitive to such conditions. But these, above all other persons, find their best protection in habituating themselves to a plenary supply of fresh air under all circumstances; by woolen clothing and by particularly avoiding small bedrooms and all such conditions as are engendered by them.

Specially sensitive persons frequently suffer from the radiation of the heat from their bodies by too close proximity to windows, though these be perfectly tight; by resting their arms on marble-top tables; or by sitting or lying too close to the wall. The abstraction of heat from the exposed surface of the body, by these means is similar to draught, and liable to the same results.

People generally rely altogether too much upon the house to exclude cold air, instead of warm clothing, by which they exclude fresh air. By habituating themselves to close rooms and impure air they create and increase their liability to disease which they exert themselves in the wrong direction to avoid.

Bedrooms should always be constructed or chosen with reference to the probability of their becoming sick rooms. Hence the size of the room, the size and place of the windows and doors with reference to light and air should be arranged accordingly. In houses of the villa type it is almost impossible to avoid placing the bed either facing the window or between it and the door; in which case the former alternative should be preferred, because the inconvenience can be modified by shades or blinds. A projecting window is always a useful addition to a bedroom, providing room for the dressing-table and increasing the amount of floor space. Recesses or closets always should be constructed, if possible, to take the place of wardrobes, but never in dark corners; and the ventilation of such wardrobes and closets should be accomplished by ornamental borings in the panels of the doors, by transoms, or by doors shorter by two inches at the top and bottom than the door space. Wearing apparel requires constant ventilation to be healthful. Movable wardrobes and all bureaus or other furniture not otherwise easily handled should, like the bedstead, rest on castors.

All bedrooms should be so planned, if practicable, when space is abundant that, in case of sickness, they can be isolated from the rest of the house, so that communication may be had with them with the least possible risk to the sick, or to the well from the

sick. Moreover, whenever practicable, bedrooms should be provided with dressing-rooms apart, two to each family bedroom, which can be entered without passing through the bedroom. The wash-basin and bath-tub, and the water-closet, should be placed apart in properly arranged recesses connected with the dressing-rooms instead of the bedrooms.

Servants Rooms.—The kind of bedrooms provided by the rich for their servants, indeed, in the construction of dwellings generally, and particularly in the modern "flats," is a disgrace to civilization. Their beds are usually placed in the low corners of attics and other out-of-the-way places, where the air space and the means of ventilation are alike grossly inadequate. That those who occupy them quickly break down and form a large quota of the mortality from consumption is not surprising to any competent observer of the conditions promotive of that disease.

Among the tenement-house population proper—that is to say, the class of tenement-houses over which the health authorities in our large cities exercise authority—the conditions are better; and this circumstance is suggestive of the query to health authorities: Are not *all* dwelling-houses occupied by three or more families tenement houses? Are flats privileged consumption incubators? It would be an easy matter for almost any busy physician in our large cities to sum up a dozen or so of black holes on his diary, which in the aggregate surpass the famous Black Hole of Calcutta.

With regard to infants, and their beds in particular, warmth, next to the purity of the atmosphere, is of essential importance. Proportionately to its internal organism the body of the infant is more than twice as great in its degree of exposure as that of an adult, and its feebleness for several months is such as to require sleep for almost the whole of its time when not nursing. Its bed should be soft and the covering light and warm. It should at the first, and for at least a week after birth, be placed upon its side, well over on its stomach, with its mouth and nose free, lest it strangle with the trickling of the saliva into the windpipe. After a time, when it has gained sufficient strength and knowledge to use its limbs, for increased comfort, it may be placed upon its back, or at its own inclination. But in placing it in bed with its mother, which is generally best, care should be always taken to so place it that it is not likely to work its way down and get its face under the bed-clothes, where it would inhale the effluvium from the body of its mother.

Cradles and cribs are not only of great convenience, due care being observed with regard to the softness and warmth of the bed and covering, but advantageous for so placing the occupant as to secure the best access to fresh air and warmth, without overheating, which should be guarded against by light wool covering.

Baby-wagons require at least the same care with regard to bed and covering, and, besides, special care in cold weather, to prevent the abstraction of heat from the body by cold pavements. To prevent this it is well to have an extra underbed; and, for the same reason, those baby-wagons are best which have high wheels.

Darkness in bedrooms is the common concomitant of dirt; and though frequently induced for ostensibly good reasons, there is no gainsaying the fact that it generally serves to conceal worse conditions than those which it portends to prevent. If a room is generally dark it is scarcely less generally dirty; and if it be but moderately well-lighted on the whole, and yet has corners and recesses into which the light does not penetrate, those corners and recesses will usually be dirty corners and recesses. Fluff and dirt, comprising in part particles of organic matter from the lungs and skin, collect in them; and the scope of the broom and dust-brush of the ordinary housemaid is too well known to describe a curve commensurate with the light, to expect anything more than an aggravation of the danger of such dirt, by merely stirring it up and increasing its liability to be inhaled or to settle in the food and drink. That household dirt generally, and of dark bedrooms in particular, is a frequent cause of such common illnesses as catarrh, sore throat, inflamed eyes and bronchitis, and sometimes of graver diseases, is beyond question by any physician who comprehends the causes of the diseases he is called upon to treat as the most important step toward their cure and subsequent prevention.

Sunlight is, indeed, the right arm of oxygen. There ought not to be a dark room in any human habitation. To have too much sunlight for health is not possible. Its excessive intensity in exceptional circumstances can always be moderated, as occasion may require, but its plenary supply should be always provided for. Of artificial light generally, it may be said that in all its forms, except that of electricity, inasmuch as it is produced by the combustion of some compound of hydrogen and carbon, previously volatilized or brought into a gaseous condition, it is

more or less injurious to the atmosphere, by consuming the oxygen and emitting mephitic gases.

Carburetted Hydrogen and *Carbon Monoxide* are two particularly dangerous gases evolved by gas lights, above all, by the use of "water gas." This gas of itself is of non-luminous flame, but it is made luminous for lighting purposes by a process called "carburetizing," by which vaporized oil is added to the gas. It has a strong odor, like that of coal gas; but it is sometimes "odorized" by the admixture of some stronger smelling and deceptive substance without any amelioration of its dangerous properties. It usually contains from 30 to 50 per cent. of *carbon monoxide*, by which it poisons all who breathe it; and so much of this poison is evolved and mixes in the air of rooms lighted with water-gas as to render all persons who occupy such rooms liable to it.

On account of the recognized danger of its use, in 1899 a commission appointed for investigation, in England, reported adversely on all illuminating gas containing over 20 per cent. of carbon monoxide, which proportion corresponds approximately to a mixture of equal volumes of coal-gas and water-gas.

The increased danger from the use of water-gas, as compared with coal-gas, is shown by statistics on the subject, by the Boston Board of Health:

In 1888 when but 1 per cent. of the gas sold in Boston for illuminating purposes was water-gas there were no deaths, suicidal or accidental, from gas poisoning. In the following year there was but 1. In 1890 the percentage from water-gas rose to eight, and there were six deaths, four accidental and two suicidal. In 1892, as a result of permissive legislation, 52 per cent. of the gas sold was water-gas, and the deaths rose to 15. In 1897, the percentage rose to 93 and the deaths to 47, 32 of which were accidental, and 15 suicidal. In the five years ending September 1, 1899, 169 deaths had occurred.

The symptoms of poisoning from carbon monoxide, as given off from water-gas illumination, are the same as those for carbon dioxide, with which intelligent persons generally are familiar.

For illuminating and heating purposes the use of water-gas undiluted should be wholly prohibited; and, when diluted, as required in England, it is still fraught with danger.

Coal-gas, candles and lamps, all means of artificial lighting, except the electric light, evolve impurities to the air and consume

oxygen, insomuch that allowance of space and ventilation should be always made for them. The impurities, however, do not bear any proportion to the intensity of the light produced: indeed, as a rule, the better the light the less the deterioration of the air. For equal amounts of light, candles and oil consume more oxygen than gas, flat wicks more than round ones, and batswing gas-burners more than argands. Each cubic foot burnt gives off at least 2 cubic feet of carbon dioxide and from 2 to 5 grains of sulphur dioxide.

Every cubic foot of coal-gas burnt requires for the effectual dilution of the products of such combustion 1,800 cubic feet of fresh air, for each cubic foot of burning gas evolves 2 cubic feet of carbon dioxide, and 2 to 5 grains of sulphur dioxide. A common batswing burner consumes 3 or 4 cubic feet of gas per hour, and therefore requires from 5,000 to 7,000 cubic feet of air hourly. In other words, such a gas-burner, in its consumption of oxygen and general deterioration of the air of a room, is equal to two full-grown men. Nevertheless, for equal quantities of light, the amount of carbon dioxide given off and oxygen consumed, is less than with candles or lamps. But gas always gives off sulphur, chiefly in the form of carbon bisulphide, which acts injuriously on pictures, bookbindings and delicate colors of fabrics, but it is at least doubtful whether this substance in such small quantities is injurious to health.

Gas-burners so contrived as to mix a large proportion of air before the burner is reached, as first contrived by Bunsen, and as more recently modified by Welsbach, ensures complete combustion of the carbon dioxide and greatly intensifies the light. These lights possess a threefold advantage: less consumption of gas, less deterioration of the air and more light. Lamps, too, are made on the same principle for burning kerosene oil. Objection is urged by some persons to these bright lights as being too trying to the eyes. And so is the sun of a bright day, if directly faced without a shade. The night lights should be so placed or shaded as to divert or soften the rays and diffuse the light. They require care with special reference to the pressure of the gas, lest it be too strong, or the orifices become choked up, when soot is deposited in the meshes of the mantle, when carbon monoxide may be formed, and a product of the imperfect combustion of the hydrocarbons, *acetylene*, given off. This is a very poisonous compound of carbon and hydrogen (C_2 H_2) of a strong, disagreeable odor, quite distinct from raw coal-gas. Moreover, *acety-*

lene gas is the gas which renders gas-stoves particularly objectionable. When the orifices become choked up with soot, as they are constantly liable to, there is less heat and an unpleasant odor. The bare statement suggests the remedy—cleanliness. Much exposure to this gas causes dizziness, nausea and syncope.

The Bath.—Everybody, to be clean, requires the bath—infants and children particularly, because of their greater functional activity; working people most of all, because they sweat most, and are, in default of the bath, the dirtiest of all people, but with it, the cleanest, because perspiration is promoted by exercise, and the scarf-skin is thereby more effectually disposed of; the skin is consequently cleaner and softer. Indeed, it may be truthfully said that persons who never sweat and bathe are never clean; and lazy people are sometimes detectable by the odor emitted from their bodies.

Thus it is observed that the skin, instead of being the mere organ of touch with external things, is, in reality, an exceedingly complex and elaborate organ richly supplied with nerves, blood vessels, lymphatic vessels, and an exquisite drainage system, upon which the health of the body, in all its parts, greatly depends.

Of the nature of sweat, everybody is more or less acquainted, but comparatively few persons appear to appreciate its purpose: to regulate the temperature of the body, which, for the maintenance of health, is confined to narrow limits. A secondary effect of sweating is to remove the scarf-skin—the particles of dead cutis which are prone to stick to the surface of the unwashed. It is most commonly observed on the scalp, where it very properly takes the significant name of dandruff, a word derived from two Anglo-Saxon words—*tan drof*—which signify *itch* and *dirt*. It is preventable by pure soap and water.

The scarf-skin, in invisible particles, as well as in scales, is particularly abundant after fevers, and especially dangerous after those of an exanthematous character, such as measles, scarlet fever, and smallpox. The warm bath and pearline, or other pure soap, should be used daily during the period of desquamation.

The daily quantity of sweat in an adult, at moderate temperature, has been computed at three pounds; but it is so dependent upon the degree of exercise as to be exceedingly variable. It is always in process, however, in healthy persons, and but rarely suspended in sick persons. Insomuch that persons who do not use the bath—those who habitually allow their skins to be continually smeared with the dirty paste that results from an accu-

mulation of putrefying scarf-skin, grease and sweat—constantly stink.

It would extend this paper to inordinate length to consider the great varieties of the bath and their indications with any degree of detail, for which reference may be made to the "Bath" in previous volumes. It must suffice, at this time, to mention the chief of them, and but briefly. The tepid, warm and hot baths are indicated by temperatures respectively 85° to 92°, 92° to 98°, and 98° to 112° Fahr. The cool bath has a temperature from 60° to 75°, and the cold bath from 60° downward to the freezing point, Fahr.

The ordinary domestic bath—the bath-tub—which has become a practical necessity to all cleanly people who can afford it, and common to domiciles and hotels, is chiefly defective because of the abominable although almost universal practice of placing it in the same room with the water-closet. Any one who indulges in the luxury of the morning cold bath, the deep and invigorating respiration which it incites and the energetic friction which it prompts, soon acquires repugnance to all sources of impurity in the air of the bath-room. Pure air, and plenty of it, are conditions no less essential than an abundance of pure water. Hotels which do not provide an abundance of both pure water and pure air, and bathing facilities, *ad libitum*, are unworthy of patronage; and "health" resorts without the bath are a misnomer.

The vapor bath is a favorite method of using warmth and moisture, and on account of its effect in preventing evaporation from the surface, is a powerful agent for increasing bodily temperature. It can be borne at a much higher temperature than the water bath—from 120° to 150° Fahr. By preventing the evaporation of the natural moisture from the skin, and adding steam thereto, apparent profuse perspiration is the common and speedy result; but this is sometimes deceptive. In some states of the system, when excessive perspiration is not easily excited, the condensation of the vapor on the skin is liable to be mistaken for it, and when this occurs the increased temperature of the body that results from such exposure is fraught with danger.

The Turkish bath consists in a succession of hot-air processes, varying in temperature from 120° to upward of 200° Fahr., subsequent shampooing, and spray douche. With regard to its value the writer's personal observation justifies the remark that it is apt to be overdone. Like the vapor bath, its object is profuse perspiration. Well persons are never benefited, and are some-

times injured by subjecting themselves to the highest temperature common to the Turkish bath; and sick persons rarely or never need it.

Packing with the wet sheet, cold and hot, carries its description with the mention. By its means the stimulating action of the water is reduced to a minimum, and the refrigerating action only is the result. But with regard to the distinction which is insisted upon by some medical practitioners and writers upon the subject, it makes little or no difference whether the sheet used be wet with cold water or hot, since the temperature of the skin and the sheet rapidly approximate, and the more rapid evaporation of the hot water speedily induces a degree of cold quite equal to that of the cold sheet, so that the choice might well be left to the fancy of the subject; the result is the same.

Sulphur baths, or rather sulphur-vapor baths, probably have no effect beyond that which would result from the vapor without the sulphur, whether applied as sulphur fumes or sulphuretted gases.

Mud baths are a nasty means of obtaining the results of a protracted warm bath—rarely indicated, and of doubtful benefit.

Galvanic and electro-magnetic baths are deceptions. Whatever benefit is derived from their use is due to the magnetic and electric currents, if applied, wholly independent of the bath; it adds nothing to the potency.

The douche, by which is meant a column of cold water poured from a height, was at one time thought to be particularly adapted to the treatment of violent lunatics, probably because they are incapable of describing its severity. Its use is a torture, more or less dangerous, and should be prohibited.

The shower bath differs from the douche by the division of the stream of water falling upon the head and shoulders; and the needle bath differs from the shower by its general application to the whole surface of the body by means of a perforated coil of pipe, within which the bather stands.

The rain bath is simply a variety of the needle bath, the shower being from the top only, but inclined. It is the people's bath *par excellence*. A boon to the working people, who have an abundance of exercise and particular need of the bath for cleanliness.

These baths are simply arranged, built in the most economical yet substantial manner, and divided into spaces just large enough for an adult to stand and move comfortably in. The bather

soaps himself, and turns on the cold or warm water, which falls upon him as a spray-douche; the mechanical action of which spray-douche, aided by his own efforts, rapidly cleanses the body, and the water flows away over the latticed door into a receptacle which conveys it to the drain-pipes. The time, consumption of water, and attendance are thus reduced to a minimum; cleanliness of the bathing-room is rapidly obtained, and the danger of contagion, which would deter many from resorting to the tub-baths, is entirely obviated.

MILK.

REPORT UPON THE RESULTS WITH DIFFERENT KINDS OF PURE AND IMPURE MILK IN INFANT FEEDING IN TENEMENT HOUSES AND INSTITUTIONS OF NEW YORK CITY: A CLINICAL AND BACTERIOLOGICAL STUDY.*

By WM. H. PARK, M.D., and L. EMMETT HOLT, M.D., of N. Y.

[*From the Rockefeller Institute for Medical Research and the Research Laboratory of the Department of Health, New York City.*]

The work, of which the following is a report, is a part of an investigation into the production, transportation and feeding of cow's milk in New York City, which was undertaken in the summer of 1901, and which was extended over two years. The entire investigation contemplated an inquiry into the condition of farms such as were supplying milk to New York, the transportation of milk, its condition on delivery and its effect upon the children in tenement houses and institutions.

Observations upon the results of feeding cow's milk to healthy infants in tenement houses were determined upon, since in this way it was believed we could best study the problem under the conditions actually existing, and also avoid those influences met with in institutions which in themselves are so deleterious to infants. For comparison, however, a number of institutions were carefully studied during the summer of 1901.

The purpose of this investigation was to gather some facts upon the following points: (1) To make a comparison of the

*Read before the Association of American Physicians, Washington, D. C., May 12, 1903.—*Medical News, December 5, 1903.*

results of infant feeding in tenements in winter and summer; (2) to determine how far such results were affected by the character of the milk used, especially its original bacterial content, its preparation, and whether it was fed after heating or raw; (3) to see to what extent results were modified by other factors, such as the care the infants received and the surroundings in which they lived.

The clinical observations contained in this report were made by the following persons who were employed by the Rockefeller Institute: Drs. Eli Long, Mary E. Goodwin, Jane Berry, Alma Vedin, Mary Willets and Marie Grund. During the first season, J. S. Mabey was employed by the Institute, but during the second by Mr. Straus. There assisted in the work as volunteers, Drs. J. Sobel, Angenette Parry and Ford. Dr. Sobel reported for two seasons on a group of babies fed from the Good Samaritan Dispensary. To all of these workers the greatest credit is due for the thorough and conscientious way in which they did their work. They were most earnest and painstaking in obtaining as far as possible the facts desired, and much of the value of this report is due to their efforts. The bacteriological investigations were for the most part carried out in the Research Laboratory of the Health Department; but also, to a considerable extent, in the Carnegie Laboratory of the New York University. Drs. Letchworth Smith, Mary E. Goodwin, Katherine R. Collins and Rose A. Bebb carried out this portion of the work.

Observations were made during the summer of 1901, the winter of 1901-2, and the summer of 1902; during each of these seasons the different groups of infants were followed for an average period of about ten weeks. A considerable number were unavoidably lost sight of owing to removal with failure to leave address, and various other causes; but all others who could be kept under observation are included in the report. Excluding all imperfect records and those cases that were observed too short a time to admit of any deductions, there remain 632, of which 98 were observed during the summer of 1901; 211 in the winter of 1901-2; 278 in the summer of 1902, and 45 in the summer of 1903. This special group of 45 is included although the observations were made after the general investigation had closed.

The plan of investigation was that each of the workers should have a group of children, never more than 50, under personal observation. So far as possible the children were kept under the same general conditions as before. The weights were taken with

great care by the physicians, at regular intervals in most cases. Nearly all of the infants were observed in their homes, to which regular visits were made twice a week for the entire period. One group of about 50 was observed by Dr. Sobel at the Good Samaritan Dispensary to which mothers came daily for the milk for their infants. When necessary one of his assistants went to their homes. In all cases advice was given in regard to matters of hygiene and the general care of the children. It was customary to stop the milk temporarily, whenever acute disturbances of digestion existed.

Bacteriological Investigation of the Milk Used in Feeding.—The clinical work was carried on in conjunction with a bacteriological study of the milk used, in order to determine whether any relationship existed between the number and character of the micro-organisms in milk, and the amount of diarrheal disease in the children to whom it was fed. Bacterial counts were made once or twice a week from the milk as given to each child. Specimens being taken at times from the raw and at times from the heated milk.

The bacteria were isolated from the milk through plating in a 2 per cent. lactose-litmus-nutrient-gelatin, or agar, and later grown upon the usual identification media. The pathogenic properties of the different bacteria were tested by intraperitoneal and subcutaneous inoculation in guinea pigs with 2 c.c. of a 48-hour broth culture, and by feeding young kittens for several days with 3 to 6 c.c. daily of a 24-hour broth culture by means of a medicine dropper.

With the characteristics of the bacteria thus determined, they were then separated into classes following as nearly as possible the lines suggested in Chester's Manual of Determinative Bacteriology. Further attempt was then made to identify as many as possible of the varieties with those previously described, using the descriptions of Chester and Migula. With a great many this proved unsatisfactory or impossible because of the incomplete descriptions in literature, or the lack of all description.

The varieties isolated represent only the species presenting greatest number in the milk examined, for in no case was more than 0.01 c.c. of a milk, and in most highly contaminated milks, only 0.001 c.c. used in making a plate, and varieties which occurred in too small numbers to be present in this quantity would necessarily be missed. For the purposes of this article it is not considered desirable to burden the reader with the enumeration

of the varieties of bacteria found in the different samples of milk and their characteristics. Only a brief summary of the results will be given.

From the milks altogether 239 varieties of bacteria were isolated and studied. These 239 varieties, having some cultural or other differences, were divided into the 31 classes, each class containing from 1 to 39 more or less closely related organisms.

As to the sources of bacteria found in milk, we made sufficient experiments to satisfy us that they came chiefly from outside the udder and milk ducts.

Bacteria were isolated from various materials which under certain conditions might be sources of contamination for the milk, and the cultures compared with those taken from milk. Thus there were obtained from 20 specimens of hay and grass, 31 varieties of bacteria; from 15 specimens of fæces, manure and intestinal contents, 28 varieties; from 10 specimens of feed, 17 varieties. Of these 76 varieties there were 26 which resembled closely those from milk, viz., 11 from grass or hay; 26 from manure; 5 from feed.

During the investigation a number of the varieties isolated from milk were shown to be identical with types commonly found in water.

From the few facts quoted above and from many other observations made during the course of the work, it would seem that the term "milk bacteria" assumes a condition which does not exist in fact. The expression would seem to indicate that a few varieties, especially those derived in some way from the cow, are commonly found in milk, which forms having entered the milk while still in the udder, or after its withdrawal, are so well fitted to develop in milk that they overgrow all other varieties.

As a matter of fact, it was found that milk taken from a number of cows, in which almost no outside contamination had occurred, and plated immediately, contained, as a rule, very few bacteria, and these were streptococci, staphylococci and other varieties of bacteria not often found in milk sold in New York City; the temperature at which milk is kept being less suitable for them than for the bacteria which fall into the milk from dust, manure, etc. A number of specimens of fairly fresh milk averaging 200,000 bacteria per c.c. were examined immediately, and again after twelve to twenty-four hours. In almost every test the three or four predominant varieties of the fresher milk remained as the predominant varieties after the period mentioned.

The above experiments seem to show that organisms which have gained a good percentage in the ordinary commercial milk at time of sale will be likely to hold the same relative place for as long a period as milk is ordinarily kept. After the bacteria pass the 10 or 20 million mark, a change occurs, since the increasing acidity inhibits the growth of some forms before it does that of others. Thus some varieties of the lactic acid bacteria can increase until the acidity is twice as great as that which inhibits the growth of streptococci. Before milk reaches the curdling point, the bacteria have usually reached over a billion to each c.c. For the most part specimens of milk from different localities showed a difference in the character of the bacteria present, in the same way that the bacteria from hay, feed, etc., varied. Even the intestinal contents of cows, the bacteriology of which might be expected to show common characteristics, contained beside the predominating colon types, other organisms which differed widely in different species and in different localities. Cleanliness in handling the milk and the temperature at which it had been kept were also found to have had a marked influence on the predominant varieties of bacteria present.

Pathogenic Properties of the Bacteria Isolated.—Intraperitoneal injection of 2 c.c. of broth or milk cultures of about 40 per cent. of the varieties tested, caused death. Cultures of most of the remainder produced no apparent deleterious effects even when injected in larger amounts. The filtrates of broth cultures of a number of varieties were tested, but only one was obtained in which poisonous products were abundantly present. Death in guinea pigs weighing 300 grams followed within fifteen minutes after an injection of 2 c.c.; 1 c.c. had little effect.

As bacteria in milk are swallowed and not injected under the skin, it seemed wise to test the effect of feeding them to very young animals. We therefore fed 48-hour cultures of 139 varieties of bacteria to kittens of two to ten days of age, by means of a glass tube. The kittens received 5 to 10 c.c. daily for from 3 to 7 days. Only one culture produced illness or death. A full report on the identification of the varieties of bacteria met with in this investigation can be found in an article by Dr. Smith in the 1902 Annual Report of the Department of Health.

After two years of effort to discover some relation between special varieties of bacteria found in city milk and the health of children, the conclusion has been reached that neither through

animal tests nor the isolation from the milk of sick infants have we been able to establish such a relation. Pasteurized or "sterilized" milk is rarely kept in New York longer than 36 hours, so that varieties of bacteria which after long standing develop in such milk did not enter into our problem. The harmlessness of cultures given to healthy young kittens does not of course prove that they would be equally harmless in infants. Even if harmless in robust infants, they might be injurious when summer heat and previous disease had lowered the resistance and the digestive power of the subjects.

This failure to discover definite pathogenic bacteria, as well as the numerous varieties of bacteria met with, have forced us to rely on the clinical observation of infants fed on raw and Pasteurized milk from the same source, and upon different milks of unknown origin varying in the number of bacteria contained. In the following pages, observations upon food are combined with those upon other factors which influenced the health of the infants.

Selection of the Children for Observation.—The original aim was to include only infants who were entirely bottle-fed, but it was found that the great majority of all infants in the tenements receive during the first six months occasional breast feedings at night, and nearly all are given some solid food after they are six months old, or as soon as they are able to hold it in their hands. The purpose of the investigation being to obtain relative results with different forms of milk and not absolute results with one form, it is believed that the conclusions reached are not affected by the fact that many of the infants received breast feeding at night. Indeed, including such infants has the advantage of studying representatives of a very large class. In each season some infants who were entirely breast-fed were observed for purposes of comparison.

In selecting the children the only conditions made were that they should not be ill or suffering from marasmus when observations were begun, and that they should be of suitable age. Of the entire number 340 were six months old or under, 265 were from seven to twelve months; 47 were a little over twelve months. With the exceptions stated, every child available was included by the physicians until the proper number was made up. The district in which most of the children lived was the lower east side of New York, as densely populated as any part of Manhattan Island.

An unexpected difficulty was encountered in beginning the investigation in the scarcity of bottle-fed infants in the region where the families were selected. One of the physicians reported that in a densely populated neighborhood where every street was swarming with children, hardly half a dozen bottle-fed infants could be found on a block. While this may not have been true of the entire district, it was the observation of all the workers that the proportion of bottle-fed infants in tenement houses was surprisingly small. This is a very different impression from what one gains from visiting dispensaries where great numbers of bottle-fed infants are seen. But the dispensaries draw patients from very large districts and gather the cases that are not doing well, so that the aggregate seems very large. This excess in proportion of the bottle-fed infants at the dispensaries over that in the houses is in itself striking testimony to the advantages of breast feeding.

The Character of the Food Employed.—It was at first intended to make no change in the food the child was receiving, but it was found necessary in order that observations might also be made upon the comparative effects of heated and unheated milk in summer to place a number of infants upon a modified raw milk supply distributed to others after Pasteurization. This was rendered all the more necessary since it was discovered that during the summer the sterilization of milk in some form was almost universally practiced in the tenements of New York. In the summer of 1902 especially, it was rare to find an infant upon raw milk; an incidental testimony to the value of the praiseworthy efforts of the Health Department, and the agitation in the public press in favor of clean milk and the necessity for sterilization in hot weather. When gastro-intestinal disturbance of any severity developed, the infants were deprived of milk for a day or two and put on barley water or other suitable food.

In the district where the observations were made the following forms of milk were extensively used: (1) Condensed milk; (2) milk purchased at small stores with groceries and other provisions and known as "store milk"; (3) bottled milk; (4) milk from central distributing stations, chiefly from the Straus milk depots and Good Samaritan Dispensary.

Condensed Milk.—That used was usually bought in cans, *i. e.*, the sweetened variety; seldom were the best brands purchased. It was generally prepared at each feeding by adding hot water which, in most cases, had been boiled.

Store Milk.—This is the poorest grade of milk sold in New York, but varies at the different stores. It is kept in large cans in the small stores and is sold to customers at an average price of four cents a quart. It averages about 3.75 per cent. of fat. It is customary for milk to be purchased twice a day and it is carried home and kept in pails or pitchers. In summer it is usually heated at once; if it curdles, it is considered to be unfit for use and is returned. During the hot days of the summer of 1901, it frequently happened that milk obtained from two or three consecutive stores would curdle. Heating is usually done in a saucepan and the temperature is raised to a point where the milk begins to "foam," seldom to a boiling point. In most cases it is kept upon ice. It is usually prepared for the infant at each time of feeding. The only modification practiced is, in most cases, dilution with water or barley water, equal parts being as a rule given when infants are about three months old and continued until ten or eleven months when whole milk is given. The bacteriological examination made of this milk during the summer of 1901 showed it to contain from 4,000,000 to 200,000,000 microorganisms, an average of about 20,000,000 per c.c. The form of heating employed killed, it was found, about 95 to 99 per cent. of the bacteria present. In the summer of 1902, owing partly to the cooler season, but chiefly to the new regulations of the Health Department regarding the care and sale of milk, the average was about 3,000,000 per c.c. During the winter the number of bacteria ranged from 100,000 to 5,000,000 bacteria per c.c., and averaged about 400,000 per c.c.

Bottled Milk.—The greater part of the bottled milk used in these tenements was handled by one of the largest dealers in the city. This milk was produced under conditions which were only fairly good. However, it was so well handled during transportation and delivery that it was nearly always in good condition when received by the consumer. This milk averaged about 500,000 bacteria per c.c. It was sold in covered jars at eight cents a quart. The same general plan of modification was practiced as with the store milk, and it was also in summer heated and usually in about the same way. As the people who purchased this were not so poor as those using store milk, they were more likely to use ice for keeping it.

Besides this bottled milk some special milk from the Walker-Gordon and Briarcliff Farms was furnished gratuitously to a limited number of cases for the sake of comparison, but this was

not widely enough used to admit of drawing conclusions sufficiently definite to be expressed in figures. This milk averaged about 10,000 bacteria per c.c.

Milk from Central Distributing Stations.—The greater part of this milk was supplied from the Straus Milk Depots of which there are a number scattered through the city, and from the diet kitchen of the Good Samaritan Dispensary, a small quantity from other diet kitchens. The milk used at these places was generally of excellent quality, usually from an "inspected" or "certified" farm, but it was mixed with poor cream. It was furnished gratis to those too poor to pay, and at a small charge, usually one cent a bottle, to others. This milk after the addition of cream averaged before Pasteurization nearly 2,000,000 bacteria per c.c.; after Pasteurization, about 500 per c.c.; after boiling, about 5 per c.c. It is supplied in small bottles, each one containing the quantity for a single feeding. The bottles are washed and sterilized at the central stations. The Straus milk was generally Pasteurized; that from the Good Samaritan Dispensary was boiled. With both some attempt at modification was made, three or four standard formulas being used. The common modification consisted in the dilution with boiled water, the addition of lime water, milk sugar, and, in some cases, cream also; or the dilution with barley water and the addition of cane sugar. Regarding the use of these formulas, the quantity for one feeding, and the number of feedings daily, directions were usually given by the physicians in attendance at the central stations. As the mothers came daily for their milk, some constant supervision of the cases was thus possible, and many minor disturbances of digestion no doubt controlled by a proper variation in the food.

Infant Foods.—It was a surprise that the proprietary foods were so little used in the tenements, the expense being apparently the chief reason. Although they were given to a number of children observed, they were seldom used for a long time, or as the sole diet, and certainly cut no figure in the results. We have therefore not classified these cases separately.

Breast Feeding.—As already stated, the great majority of infants reared in tenements are breast-fed, at least for the first six months. No effort was made to collect many observations upon these children, but a few were introduced for the sake of comparison. It was thought at first to make a separate division of the children who were partly breast-fed, as it was the impression of some of the *physicians who followed* the cases that a decided

difference existed between those who were partly nursed, usually at night, and those entirely fed. However, the general figures when tabulated did not show any very marked difference. The results seem to have depended rather upon the character of the other food.

In estimating the results obtained by the different methods of feeding two things were considered: first, the gain or loss in weight, and secondly, the amount of digestive disturbance, particularly diarrhea, which occurred in the different groups of infants. These cases have been divided according to results in four groups: (1) Those which did well. In this group are included the infants who made a substantial and generally a regular gain in weight during the period of observation, this usually amounting to from two to five pounds for the ten or twelve weeks, and those that had no diarrhea worth mentioning—usually both conditions existed together. (2) Those which did fairly, including those in which some diarrheal disturbance was present but not of a serious nor prolonged character, and in which the weight was either stationary or the gain very slight. Both these generally went together. (3) Those which did badly, including those in which considerable digestive disturbance, usually diarrhea, was present, or in which there was a loss in weight; generally here also both factors existed. (4) The fatal cases.

The following tables show in a condensed form the results obtained with the different foods employed in winter and in summer:

TABLE I. FOOD AND RESULTS.—WINTER.

	Did well.	Did fairly.	Did badly.	Died.	Totals.
Store milk	47	6	2	0	55
Condensed milk	39	5	2	2	48
Good bottled milk	51	13	1	3	68
Milk from Central Distributing Stations	35	20	4	0	59
Best bottled milk	5	0	1	0	6
Breast feeding	7	1	0	1	9
Totals, excluding cases counted twice	156	41	8	6	211

TABLE II. FOOD AND RESULTS.—SUMMER.

	Did well.	Did fairly.	Did badly.	Died.	Totals.
Store milk	21	23	20	15	79
Condensed milk	22	20	14	14	70
Good bottled milk	37	23	29	9	98
Milk from Central Distributing Stations	84	33	24	4	145
Best bottled milk.	9	3	0	0	12
Breast feeding	17	7	7	0	31
Totals, excluding cases counted twice	184	108	88	41	421

Season and Results.—Nothing could be more striking than the contrast between the results in winter and in summer. The general summary shows that of the 211 winter cases, 156 did well; 41 did fairly well, 8 did badly and 6 died. In other words, what might be considered good results were shown in 93 per cent. of the cases, and bad results in only 7 per cent. Furthermore, in only one of the six deaths was the cause connected with the digestive tract.

Of the 421 summer cases, 184 did well, 108 did fairly, 88 did badly and 41 died. In other words, goods results were obtained in 69 per cent. of the cases and bad results in 31 per cent., while in nearly all of the fatal cases death was due to diarrheal diseases. It should be remembered that all the children both winter and summer had the advantage of some continuous intelligent oversight, usually one visit a week and often two being made by the physicians. This supervision contributed in no small degree to the results in both groups of cases.

The difference in results in the summers of 1901 and 1902 was not great; the percentage of bad results in 1901 being 37; in 1902, 35. This may have been due to the slightly cooler season of 1902, or the better general quality of the city's milk. The proportion of children on the different varieties of milk varied somewhat in the two years, so that a strict comparison is difficult.

The showing made by the winter cases is most gratifying and was indeed a surprise to all. So large a percentage of good results by all methods of feeding, and apparently so little difference between them, was not expected. Artificial feeding in the tene-

ments in winter would seem to be comparatively a simple problem.

To what shall be ascribed the great difference between summer and winter results? There seem to be many factors, but a consideration of the facts accumulated indicate that heat is the primary factor, and bacteria and their products a secondary one, except when the contamination is extreme or pathogenic organisms are present.

The effect of continued heat upon the health of infants is shown in the number of cases of diarrheal diseases and the number of deaths during the months of the summer of 1901 in an institution in the country near New York City, where a fairly pure milk was fed raw. During the winter and spring there was almost no diarrhea; with the warm weather of June it increased, reaching its highest point in August. The comparative results with the breast and bottle-fed infants are also evident:

Month.	No. of Infants.	Food.	Deaths.
June	34	Breast milk	0
	25	Cows' milk	0
	38	Breast and cows' milk	0
	128*	Milk and barley food	0
Total....	225		
	Number of cases of diarrhea, 15; deaths, 0.		
July	32	Breast milk	0
	20	Cows' milk	3
	38	Breast and cows' milk	0
	124*	Milk and barley food	0
Total....	214		
	Cases of diarrhea, 38; total deaths, 3 (all bottle-fed).		
August	28	Breast milk	0
	18	Cows' milk	3
	32	Breast and cows' milk	4
	129*	Milk and barley food	2
Total....	207		
	Cases of diarrhea, 50; total deaths, 9.		

*Those on milk and barley food were all over twelve months old.

Food and Results.—(1) Store Milk.—The largest number of bad results were seen, as was expected, with the cheap store milk, where not only was the milk poorer, but the care at home less. The winter observations upon this milk included 55 cases in about half of which some method of partial sterilization was employed; in the remainder it was given raw. Of these 55 infants, 47 did well; 6 did fairly; only 2 did badly and none died. Combining those who did well and those who did fairly, we have what may be considered good results in 96 per cent. of the cases and bad results in only 4 per cent. There was little apparent difference in results between those taking raw and those taking heated milk.

Store milk was the food of 79 of the summer cases. Of these 21 did well; 23 did fairly; 20 did badly and 15 died; in other words, good results in 56 per cent. of the cases, and bad results in 44 per cent. In nearly all of these cases the milk was heated in some way before feeding; usually it was raised nearly to the boiling point. This had the effect, it was found, of killing about 99 per cent. of the micro-organisms present, but the milk still contained after such heating between 5,000 and 500,000 bacteria to the c.c. An interesting point of tolerance of such milk was noticed in many cases. A number of infants living in bad surroundings, yet who received fairly good care, took only cheap store milk and yet remained well throughout the entire summer. During 1901 some of the store milk was very bad, averaging on hot days over 100,000,000 bacteria per c.c.

(2) Condensed Milk.—There were 48 winter observations upon infants taking condensed milk; 39 children did well, 5 did fairly, 2 badly, and 2 died, *i. e.*, good results were seen in 92 per cent. and bad results in 8 per cent. of the cases.

There were 70 summer observations made upon infants taking condensed milk. Only 22 of these children did well, 20 did fairly, 14 badly, and 14 died; or 60 per cent. good results and 40 per cent. bad results.

The results with condensed milk can hardly be attributed to the bacteria, inasmuch as it was almost invariably prepared with boiled water and contained relatively a small number of micro-organisms before heating. These children were often apparently in good condition until attacked with acute disease, when they offered but little resistance and seemed to succumb more quickly than any other class of patients. In one family three healthy infants, triplets, five months old, were taken sick on the same day

with vomiting and diarrhea; one died within twenty-four hours, one within two days, and the third within a week. A bacteriological examination of the prepared milk remaining in one bottle showed nothing noteworthy.

(3) Bottled Milk.—The better results observed with bottled milk should not be put down as entirely due to the character of the food. The people who purchased it were seldom so poor as those buying store milk; they were usually more intelligent and probably more careful in handling the milk. Often they had ice.

There were 68 winter observations on children fed upon bottled milk; of these 51 did well, 13 fairly, only 1 did badly, and 3 died. None of these deaths were due to intestinal disease. In other words, there were good results in 94 per cent. of the cases, and bad results in 6 per cent.

There were 98 summer observations upon infants fed on bottled milk; of these 37 did well, 23 fairly, 29 did badly, and 9 died. In other words, 61 per cent. of good results and 39 per cent. bad results. In these quite a number received the milk raw, but as in the other observations, as soon as any illness occurred, some form of attempt at sterilization was almost invariably practiced.

It is interesting to compare these results with those seen with store milk just above them in the table. The percentage mortality with the better grade of milk is only about one-half that seen with either condensed or store milk, and yet the large number of infants who did badly brings the proportion of bad results with bottled milk almost up to that with the two preceding varieties. It was noteworthy, however, that among infants included as doing badly there was on the average less sickness than among those fed on store milk. It would seem therefore that good bottled milk as now used, while much less dangerous to life than cheap store milk, is still, judging by this proportion of failures, rather unsuccessful as a method of feeding.

(4) Milk from Central Distributing Stations.—There were 59 winter observations upon these patients, of which 35 did well, 20 fairly, 4 did badly and none died. In other words, good results in 93 per cent. of cases and bad results in 7 per cent.

There were 145 summer observations upon infants fed in this way; of these 84 did well, 33 did fairly, 24 did badly, and 4 died. In other words, 81 per cent. of good results, and 19 per cent. bad results. In about one-half of these cases the milk was Pasteurized; in the remainder, with the exception of a group of

42 cases to be mentioned later, in which the milk was given raw, the milk was sterilized.

The great difference between these results and those obtained with the three forms of feeding already considered deserves special attention. The original milk used at the stations was of good quality, but not much better than the bottled milk generally used; with both some form of sterilization was practiced. The difference in results is not explained by the difference in these two factors. There were others of importance which must be sought. A certain amount of constant supervision was exercised over these infants, as some one, usually the mother, came daily to the milk dispensary for the food. Changes could thus be readily made in the milk according to the child's condition. If symptoms of slight indigestion were present, the mother was instructed to dilute the milk; with more severe symptoms, milk was temporarily stopped, etc. This supervision seems to us of the greatest value and can hardly be secured so well in any other way. Again, a mother sufficiently interested in her baby to come or send daily several blocks for the milk is generally one who values what she receives and also the advice which goes with it. This food, obtained in separate bottles for each feeding, is generally regarded by the tenement population as not exactly milk but as something very special, and therefore entitled to much more consideration than any form of food which they could prepare themselves at home.

Another point of importance is that some systematic attempt at milk modification was made in the milk furnished from central stations. Although this could not be done as accurately as for a smaller number of patients, the results were certainly improved by it. Again, what contributed in no small degree to success with this plan of feeding, was that this milk was supplied in separate bottles for each feeding, that the quantity for one feeding was suitable for the child, and that only a proper number of feedings for the twenty-four hours was dispensed at one time. There was not, therefore, the temptation to overfeeding and too frequent feeding, which with other methods are so generally practiced. Finally, the bottles in which it was kept were always properly cleansed, and sterilized, since this was attended to at the central station.

(5) Best Bottled Milk.—This was furnished to 18 infants living in the tenements, to discover whether any perceptible difference existed between the results with this milk and the other va-

rieties. While these observations are not numerous enough to admit of any generalizations, they indicate what was previously believed, that, with the cleanest milk from the best cared for cattle, the smallest number of bad results occurred.

There were 12 infants placed upon this milk in summer; of these 9 did well, 3 fairly, there were none who did badly and no deaths. There were 6 infants upon this milk in winter, of whom 5 did well and 1 did badly.

The difference between very bad, highly contaminated milk, like that purchased at some of the small stores previous to 1902, and the best bottled milk, was in some cases very striking. Protracted diarrhea in infants who were taking store milk was often immediately improved and in several instances promptly cured by simply substituting clean milk, after an interval of no milk, for the previous food. In some severe cases, however, no improvement followed the purer milk.

Age and Results.—In 17 cases the ages were not recorded. Of the summer cases 217 were infants under six months; 191 were between six and twelve months, and 47 were over twelve months. The comparative results for the different ages are shown in the following table:

TABLE III. AGE AND RESULTS.—SUMMER.

	Did well. Per cent.	Did fairly. Per cent.	Did badly. Per cent.	Died. Per cent.
Under 6 months...	52	16	19	13
7 to 12 months....	34	32	26	8
Over 12 months...	49	32	19	0

Of the winter cases 123 were infants under six months, and 74 from seven to twelve months; none was over twelve months.

TABLE IV. AGE AND RESULTS.—WINTER.

	Did well. Per cent.	Did fairly. Per cent.	Did badly. Per cent.	Died. Per cent.
Under 6 months...	74	21	0	5
7 to 12 months....	70	20	10	0
Over 12 months...	..	..	..	..

These figures indicate a considerably higher mortality in infants under six months, but a surprisingly large proportion of infants over this age who did badly. In summer, other factors

than the milk used must be taken into account, one of the most important being the unwise giving of table food to infants over six months old, a practice which is almost universal in the tenement population. Giving fruits even to infants is also an important cause of illness. This was strikingly seen among the Italians. In this class of the population it was the opinion of some of the physicians who observed these cases, that the use of fruit, often unripe, stale or partly decayed, was the cause of more illness in infants and young children than the impure milk.

A separate study has been made of these cases which did badly, and the fatal cases, to determine any other factors beside the food and age which contributed to the results. An attempt was made to discover what sort of care these infants received, what their surroundings were, and whether the results in feeding were due to conditions or diseases entirely outside the digestive tract.

Cases Doing Badly.—There were 96 infants who did badly, *i. e.*, they lost weight during the period of observation and had more or less disease of the digestive tract. Eighty-eight of these were summer cases and 8 were winter cases. The previous condition of this group of infants does not throw any special light upon results. This is noted in 86 of the 96 cases. In 52 the previous condition was put down as "good," and in 30 as "not good." It should be remembered that no infants previously in bad condition were included in the observations. The proportion of "good" and "not good" is about the same as in the children taken as a whole.

Care.—In the 88 summer cases this was not stated in 14; 30 were reported as receiving good care, 20 as having fair care, while 24 were positively neglected. The importance of the care the children received, as affecting the results of infant feeding, cannot be expressed in figures. What is included here as neglect was often of the grossest kind. As for example, where a mother was away all day at work and the infant left in charge of some old man, or irresponsible child, and where the visitor found bottles dirty, nipples rolling about the floor, sour milk in the feeding bottles, etc. It was practically the unanimous opinion of the physicians who made the observations that intelligent care had more to do with the results of feeding than any other factor. Many individual instances were reported of infants living under the worst surroundings and whose food was a very inferior kind of milk, and yet if the mother was intelligent and the infant well cared for, it throve in spite of the unfavorable

conditions. On the other hand if the infant had no proper care it made little difference how good the milk furnished might be, the results were usually bad. One case will serve as an illustration. An Italian child two months old who had an intelligent, careful mother, did well for the entire summer on store milk. The following winter the mother was ill for a long time, during which time the child ran down steadily in spite of the fact that it was older and the weather was cold.

Surroundings.—While surroundings had a distinct influence upon the results in feeding, they were decidedly of less importance than the care. Since all these infants lived in tenements none could be said to have good surroundings. They were fair in 40 of the summer cases; distinctly bad in 33; in 15 they were not noted. Of the 8 winter cases, 7 had fairly good surroundings. By bad surroundings are meant very crowded apartments, rear tenements or basements. Many infants living in such places were rarely taken into the open air. Where the mothers availed themselves of the opportunities offered for day excursions upon the water and such fresh air as even the crowded city afforded, a distinct improvement was seen in the condition of the children.

Diarrheal Diseases and Other Forms of Acute Illness.—The number of days of diarrhea indicates pretty well the nature of the symptoms from which these infants chiefly suffered. Of the 88 cases which did badly, only 3 had no diarrhea; 19 had diarrhea lasting from one to seven days; 19, diarrhea from eight to fourteen days; 47, diarrhea of more than two weeks' duration. Other complications were present in 11 cases: bronchitis in 5; pertussis in 2; otitis in 1, and pneumonia in 3 cases. Of the 8 winter cases which did badly, none had diarrhea, but three had other complications, viz., one had measles, one bronchitis, and one pertussis.

Fatal Cases.—Of the 632 children observed, 47 or 7.5 per cent. died during the three months of observation. The mortality of the 211 winter cases was 2.8 per cent.; of the 421 summer cases, 11.3 per cent. Of infants under one year, neither in the age nor the previous conditions do we find any sufficient explanation of the fatal result. In the 47 observed who were over one year, no deaths occurred. The care which the fatal cases received is significant. Only 16 of the 47 infants who died received good care, and 19 were recorded as positively neglected. In 21 of the cases the surroundings were bad. The causes of death in the fatal cases were as follows:

Disease.	Summer.	Winter.
Diarrheal diseases	32	1
Pneumonia	5	2
Tuberculosis	2	0
Rickets	1	0
Diphtheria	1	0
Marasmus	0	1
Accident	0	1
Unknown	0	1
	41	6

The winter case having diarrhea was fed upon good bottled milk sterilized, and had gastric as well as intestinal symptoms. The marasmus case was a child fed upon condensed milk. In only two of the winter deaths could the result be definitely connected with the feeding; while in summer this was true of 30 of the cases.

Heated Milk vs. Raw Milk for Infants.—During each of the summers of 1902 and 1903, a special lot of milk was modified at one of the Straus depots for a group of 50 infants, all of whom were under nine months of age, and distributed daily in the usual way. To one-half the infants the milk was given raw; to the other half, Pasteurized.

The modified milk was made from a fairly pure milk mixed with ordinary cream. The bacteria contained in the milk numbered on the average 45,000 per c.c., in the cream 30,000,000. The modified raw milk taken from the bottles in the morning, averaged 1,200,000 bacteria per c.c.; the Pasteurized, about 1,000; taken in the late afternoon of the same day, they had respectively about 20,000,000 and 50,000.

Twenty-one predominant varieties of bacteria were isolated from six specimens of this milk collected on different days. The varieties represented the types of bacteria frequently found in milk. The infants were selected during the first week in June, and at first all were placed on Pasteurized milk. The 50 infants which had been selected were now separated into two groups as nearly alike as possible. On June 15, the milk was distributed without heating to one-half the infants, the other half receiving as before the heated milk. In this way the infants in the two groups received milk of identically the same quality, except for the changes produced by heating to 165° F. for thirty minutes. The

infants were observed carefully for three months and medical advice was given when necessary. When severe diarrhea occurred barley water was substituted for milk.

The first season's trial gave the following results. Within one week 20 out of the 27 infants put on the raw milk suffered from moderate or severe diarrhea; while during the same time only 5 cases of moderate and none of severe diarrhea occurred in those taking Pasteurized milk. Within a month 8 of the 27 had to be changed from raw back to heated milk, because of their continued illness; 7, or 25 per cent., did well all summer on raw milk. On the other hand, of those receiving the Pasteurized milk, 75 per cent. remained well, or nearly so, all summer, while 25 per cent. had one or more attacks of severe diarrhea. There were no deaths in either group of cases.

During the second summer a similar test was made with 45 infants. Twenty-four were put on raw modified milk; 13 of these had serious diarrhea, in 5 of whom it was so severe that they were put back upon heated milk; 10 took raw milk all summer without bad effects; 2 died, 1 from gross neglect on the part of the mother, the other from diarrhea. Of the 21 on Pasteurized milk, 5 had severe attacks of diarrhea, but all were kept on this milk except for short periods, when all food was omitted; 16 did well throughout the summer. One infant, markedly rachitic, died.

The outcome of these observations during the two summers are summarized in the following table:

Kind of Milk.	*Number of infants.*	*Remained well for entire summer.*	*Number having severe or moderate diarrhea.*	*Average number days off milk during summer.*	*Average weekly gain in weight.*	*Average number days diarrhea.*	*Deaths.*
Pasteurized milk, 1,000 to 50,000 bacteria per c.c..	41	31	10	3	4 oz.	3.9	1
Raw milk, 1,200,000 to 20,000,000 bacteria per c.c	51*	17	34	5.5	3.5 oz.	11.5	2

Although the number of cases was not large, the results, almost identical during the two summers, indicate that even a fairly pure

*Thirteen of the 51 infants on raw milk were transferred before the end of the trial to Pasteurized milk, because of serious illness. If these infants had been left on raw milk, it is believed by the writers that the comparative results would have been even more unfavorable to raw milk.

milk when given raw, in hot weather, causes illness in a much larger percentage of cases than the same milk given after Pasteurization. A considerable percentage of infants, however, do apparently quite as well on raw as on Pasteurized milk.

Observations Upon the Use of Feeding Raw and Heated Milk in Older Children.—The children over three years of age who received unheated milk, containing at different times from 145,000 to 350,000,000 bacteria per c.c., showed almost no gastro-intestinal disturbance. The conditions at three institutions will serve as examples.

In the first of these an average grade of raw milk was used, which, during the summer, contained from 2,000,000 to 30,000,000 bacteria per c.c. This milk was stored in an ice-box until required. It was taken by the children unheated, and yet no case of diarrhea of sufficient gravity to send for a physician occurred during the entire summer. This institution was an orphan asylum containing 650 children from three to fourteen years of age, viz., three to five years, 98; five to eight years, 162; eight to fourteen years, 390.

A second institution used an unheated but very pure milk which was obtained from its own farm. This milk averaged 50,000 bacteria per c.c. The inmates were 70 children of ages ranging from three to fourteen. In this institution not a single case of diarrheal disease of any importance occurred during the summer.

In a third institution an average grade of milk was used which was heated. This milk before heating contained 2,000,000 to 20,000,000 bacteria per c.c. The institution was an infant asylum in which there were 126 children between the ages of two and five years. There were no cases of diarrhea during the summer.

These clinical observations taken in connection with the bacteriological examination at the laboratory show that, although the milk may come from healthy cattle and clean farms, and be kept at a temperature not exceeding 60° F., a very great increase in the number of bacteria may occur. Furthermore, this may occur without the accumulation in the milk of sufficient poisonous products or living bacteria to cause appreciable injury in children over three years of age, even when such milk is consumed in considerable amount and for a period extending over several months. Milk kept at temperatures somewhat above 60° F. was not met with in our investigations, but the histories of epidemics of ptomain poisoning teach that such milk may be very poisonous. It is also to be remembered that milk abounding in bacteria on account of its

being carelessly handled is also always liable to contain pathogenic organisms derived from human or animal sources.

Results with Very Impure Milk Heated vs. Those with Pure or Average Milk Heated.—During the summer of 1901 we were able to observe a number of babies fed on milk grossly contaminated by bacteria. In 1902, a systematic oversight of all stores selling milk was instituted by the Health Department, so that the very worst milk was not offered for sale that summer.

Table Showing the Results of Feeding During July and August, 1901, in Tenement Houses, of 112 Bottle-Fed Infants Under One Year of Age, and of 47 Bottle-Fed Infants Between One and Two Years of Age with Milk from Different Sources, and the Number of Bacteria Present in the Milk.

Character of Milk.	*Infants under one year.*					*Infants over one year.*				
	Number of infants.	*Average weekly gain.*	*Diarrhœa.* Mild.	*Diarrhœa.* Severe.	*Deaths.*	*Number of infants.*	*Average weekly gain.*	*Diarrhœa.* Mild.	*Diarrhœa.* Severe.	*Deaths.*
(1) Pure milk boiled and modified at dispensary or stations; given out in small bottles. Milk before boiling averaged 20,000 bacteria per c.c.; after boiling 2 per c.c.	41	3 oz.	10	8	1*					
(2) Pure milk 24 hours old, sent in quart bottles to tenements, heated and modified at home, 20,000 to 200,000 bacteria per c.c. when delivered	23	4⅛ "	8	5	0	24	4½ oz.	8	2	0
(3) Ordinary milk 36 hours old, from a selected group of farms, kept cool in cans during transport; 1,000,000 to 25,000,000 bacteria per c.c., heated and modified at home before using	18	4 "	6	6	1†	12	4 "	1	2	0
(4) Cheap milk, 36 to 60 hours old, from various small stores, derived from various farms, some fairly clean, some very dirty; 400,000 to 175,000,000 bacteria per c.c.	21	¼ "	4	13	4‡	7	⅛ "	1	3	0
(5) Condensed milk of different brands. Made up with hot water. As given, contained bacteria from 5,000 to 200,000 per c.c.	9	⅛ "	5	2	3	4	3⅜ "	1	3	0
(6) Breast Milk	16	2¼ "	5	2	0					

The observations upon the impure milk of 1901 are of sufficient importance to be given in detail, although already mentioned in this report in the observations upon infants of both summers which were fed on "store milk." A group of over 150 infants was so divided that 20 per cent. were allowed to remain on the cheapest store milk which they were taking at the time. To about the same number was given a pure bottled milk from Briarcliff Farms, sent to their homes free of charge by Mr. Walter W. Law. A third

*This infant died from enteritis and toxemia.

†This infant died of pneumonia. There had been no severe intestinal disorder noted.

‡One of the four had pertussis, the remaining three died from uncomplicated enteritis.

group was fed on the same quality of milk as the second, but sterilized and modified at the Good Samaritan Dispensary. A fourth group received milk from an ordinary dairy farm. This milk was sent to a store in cans and called for by the people. A few infants fed on breast and condensed milk were observed for control.

In estimating the significance of the observations recorded in the tables, one should bear in mind that not only do different infants possess different degrees of resistance to disease, but that, try as hard as the physicians could, it was impossible to divide the infants into groups which secured equal care, and were subjected to exactly the same conditions. It was necessary to have the different groups in somewhat different parts of the city. It thus happened that the infants on the cheap store milk received less home care than the average, and that those on the pure bottled milk lived in the coolest portion of the city. Certain results were, however, so striking that their interpretation is fairly clear. It is to be noted that the number of infants included in each group is small.

There is nothing in the observations to show that fairly fresh milk from healthy cows, living under good hygienic conditions and containing, on some days, when delivered, as many as 200,000 bacteria per c.c., had any bacteria or any products due to bacteria that remained deleterious after the milk was heated to near the boiling point.

On the other hand it is possible that certain varieties of bacteria may, under conditions that are unsanitary, find entrance to milk and survive moderate heat or may develop poisonous products resistant to heat in sufficient amount to be harmful, even when they have accumulated to less than 200,000 per c.c.

Turning now to the results of feeding with milk which has been heated, and which before sterilization contained from 1,000,000 to 25,000,000 bacteria per c.c., averaging about 15,000,000, though obtained from healthy cows living under fairly decent conditions and kept moderately cool in transit, we find a distinct increase in the amount of diarrheal disease. Though it is probable that the excessive amount of diarrhea in this group of children was due to bacterial changes which were not neutralized by heat or to living bacteria which were not killed; yet it is only fair to consider that the difference was not very great and that the infants of this group were under surroundings not quite as good as those on the purer milk.

Finally, we come in this comparison to the infants who received the cheap store milk Pasteurized. The milk had frequently to be returned because it curdled when boiled, and contained, according to the weather, from 4,000,000 to 200,000,000 bacteria per c.c. In these infants the worst results were seen. This is shown not only by the death rate, but by the amount and the severity of the diarrheal diseases, and the general appearance of the children as noted by the physicians. Although the average number of bacteria in the milk received by this group is higher than that received by the previous group, the difference in results between this group and the previous one can hardly be explained by the difference in the number of bacteria. The varieties of bacteria met with in this milk were more numerous than in the better milk, but we were unable to prove that they were more dangerous. Probably the higher temperature at which the milk was kept in transit and the longer interval between milking and its use allowed more toxic bacterial products to accumulate.

Observations Upon Milk Feeding in Institutions.—During the summer of 1901, observations were made by Dr. Long in nearly all the institutions for children situated in New York City. He found, with three exceptions, that no particular care was taken to secure a supply of pure milk. Samples taken from the supply of the other institutions showed that the milk averaged over 1,000,000 bacteria per c.c. when delivered, and at half of them it averaged over 10,000,000 per c.c. The cream frequently contained 60,000,000 bacteria per c.c. The milk at two places contained at times over 100,000,000, At several special hospitals for young children the milk and cream contained on different days from 26,000,000 to 157,000,000 bacteria per c.c. Formaldehyde was also occasionally found, especially in the cream. Samples of milk were taken weekly from most of the institutions and examined as to the number of bacteria, and in some cases also as to the varieties present.

As a rule to the children who were over three years old the milk was given raw, while for those under two it was heated (sterilized). For those between two and three years, it was sometimes heated, sometimes not. In only two institutions was it possible to trace any epidemic of diarrhea among the infants and older children, and in these, the particulars of which are given below, the results cannot be reasonably attributed to the milk.

The first epidemic of diarrhea occurred at the New York Infant Asylum during June and July, 1901. There were in the institu-

tion 86 infants; 30 of these were bottle-fed and 56 were on breast milk. Of the 30 bottle-fed infants, 22 suffered from diarrhea. Of the 56 breast-fed infants, only 7 were affected. The epidemic was mild in character, only 2 infants dying.

This epidemic, which occurred during and after a period of very hot weather, at first glance might be ascribed to the milk. The fact, however, that 7 cases occurred among the breast-fed infants, that the cases occurred from time to time, not simultaneously, and that the milk used had been previously heated, points rather to an infection communicated from the sick to the well than to one conveyed by the milk, unless it was true that the milk had been contaminated in the wards.

In another institution an epidemic of moderately severe diarrhea occurred during the winter, in which at first all the cases came from one ward, and then later from a second ward. In this epidemic, infection through the milk was not conceivable, since the bottle-fed infants in the wards where no illness occurred received milk from the general supply.

General Conclusions.—In addition to the statistical reports of their observations, the different physicians who watched the infants in their homes were asked to state their own conclusions regarding the general problem of infant-feeding in the tenements. These general impressions are most suggestive and cannot fail to be of interest to all who are working at this difficult problem.

It was practically the unanimous opinion that the most important factor in securing good results is intelligent care. This covers much: clean bottles and nipples; the willingness and ability to carry out directions as to methods of feeding, quantities, frequency, the stopping of milk at the first signs of serious diarrhea, etc.; proper care of the milk itself while in the house, and methods of sterilizing; suitable clothing and cleanliness of the children, and as much fresh air as possible.

Most of the physicians stated that, leaving out the very worst store milk in summer, the results were much less affected by the character of the milk than they had anticipated, and distinctly less than by the sort of care the infants received.

The surroundings alone had much less influence on results than was anticipated. For not only were breast-fed infants found doing well under the most unfavorable surroundings, but those also who received only the bottle as a rule did well, provided they received intelligent care and good milk.

The depressing effects of great atmospheric heat, *i. e.*, a temperature in the neighborhood of 90° F., or over, were very marked in all infants, no matter what their food. Those who were ill were almost invariably made worse, and many who were previously well became ill. A bad method of feeding, or, rather, a feeding without any method, was responsible for many failures when the milk itself was of good quality. Common mistakes were, feeding an infant every time it cried; giving it a full bottle, no matter what the age of the child, and letting it take as much as it would; preparing a large bottle of food at one time, and warming it over from time to time until the child had taken the whole of it, or allowing the milk to turn sour in the feeding bottle. Quantities proper for single feedings were almost invariably disregarded. Proper washing of feeding bottles was seldom seen in a tenement-house. Such matters as these are closely connected with intelligent care, which has been already considered.

The importance of the matters just mentioned raises the question of how much can be accomplished by the distribution of printed slips of directions. It was the observation of the physicians that comparatively little can be accomplished by these alone. Such printed circulars are often treated by the tenement-house mother very much as most of us treat the printed advertisements which are left at our doors—seldom read and soon thrown away. Mothers are often anxious and willing, but ignorant and stupid. Many cannot read and many more have not the wit to apply in practice what they read. When, however, such printed advice was preceded or accompanied by personal explanation, it was found of great assistance. Personal contact is the only sure way to influence these people, and this must be frequently repeated to influence them permanently; as an aid to this, printed slips are useful. Printed directions, however, should be as simple as possible in statement, few in number, and touch only the most vital matters, telling the mother always what she is to do, not what she is not to do.

Summary.—The observations here recorded were made upon the groups of infants for periods of about three months only, and the conclusions drawn relate especially to the more immediate effects of the milk.

1. During cool weather neither the mortality nor the health of the infants observed in the investigation was appreciably affected by the kind of milk or by the number of bacteria which it contained. The different grades of milk varied much less in the

amount of bacterial contamination in winter than in summer, the store milk averaging only about 75,000 bacteria per c.c.

2. During hot weather, when the resistance of the children was lowered, the kind of milk taken influenced both the amount of illness and the mortality; those who took condensed milk and cheap store milk did the worst, and those who received breast milk, pure bottled milk, and modified milk did the best. The effect of bacterial contamination was very marked when the milk was taken without previous heating; but, unless the contamination was very excessive, only slight when heating was employed shortly before feeding.

3. The number of bacteria which may accumulate before milk becomes noticeably harmful to the average infant in summer differs with the nature of the bacteria present, the age of the milk, and the temperature at which it has been kept. When milk is taken raw, the fewer the bacteria present the better are the results. Of the usual varieties, over 1,000,000 bacteria per c.c. are certainly deleterious to the average infant. However, many infants take such milk without apparently harmful results. Heat above 170° F. (77° C.) not only destroys most of the bacteria present, but, apparently, some of their poisonous products. No harm from the bacteria previously existing in recently heated milk was noticed in these observations unless they had amounted to many millions, but in such numbers they were decidedly deleterious.

4. When milk of average quality was fed sterilized and raw, those infants who received milk previously heated did, on the average, much better in warm weather than those who received it raw. The difference was so quickly manifest and so marked that there could be no mistaking the meaning of the results. The bacterial content of the milk used in the test was somewhat less than in the average milk of the city.

5. No special varieties of bacteria were found in unheated milk which seemed to have any special importance in relation to the summer diarrheas of children. The number of varieties was very great, and the kinds of bacteria differed according to the locality from which the milk came. None of the 139 varieties selected as most distinct among those obtained injured very young kittens when fed in pure cultures. A few cases of acute indigestion were seen immediately following the use of Pasteurized milk more than thirty-six hours old. Samples of such milk were found to contain more than 100,000,000 bacteria per c.c., mostly spore-bearing varieties. The deleterious effects, though striking, were not serious

nor lasting. At the present time there is in New York City no general sale from stores of "Pasteurized" or "sterilized" milk, so that it is here very rare for such milk to be used thirty-six hours after heating.

6. After the first twelve months of life, infants are less and less affected by the bacteria in milk derived from healthy cattle. According to these observations, when the milk had been kept cool the bacteria did not appear to injure the children over three years of age, at any season of the year, unless in very great excess.

7. Since a large part of the tenement population must purchase its milk from small dealers, at a low price, everything possible should be done by health boards to improve the character of the general milk supply of cities by enforcing proper legal restrictions regarding its transportation, delivery, and sale. Sufficient improvements in this respect are entirely feasible in every large city to secure to all a milk which will be wholesome after heating. The general practice of heating milk which has now become a custom among the tenement population of New York is undoubtedly a large factor in the lessened infant mortality during the hot months.

8. Of the methods of feeding now in vogue, that by milk from central distributing stations unquestionably possesses the most advantages, in that it secures some constant oversight of the child, and since it furnishes the food in such a form that it leaves the mother least to do, it gives her the smallest opportunity of going wrong. This method of feeding is one which deserves to be much more extensively employed, and might, in the absence of private philanthropy, be wisely undertaken by municipalities and continued for the four months from May 15 to September 15.

9. The use, for infants, of milk delivered in sealed bottles, should be encouraged whenever this is possible, and its advantages duly explained. Only the purest milk should be taken raw, especially in summer.

10. Since what is needed most is intelligent care, all possible means should be employed to educate mothers and those caring for infants in proper methods of doing this. This, it is believed, can most effectively be done by the visits of properly qualified trained nurses or women physicians to the homes, supplemented by the use of printed directions.

11. Bad surroundings, though contributing to bad results in feeding, are not the chief factor. It is not, therefore, merely by better housing of the poor in large cities that we will see a great *reduction in infant mortality.*

12. The observations indicate that close percentage modification of milk, although desirable in difficult cases, is not necessary to obtain excellent results with the great majority of infants, and that a certain adjustment of a healthy infant to its food is usually soon secured.

13. While it is true that even in the tenements the results with the best bottle-feeding are nearly as good as average breast-feeding, it is also true that most of the bottle-feeding is at present very badly done, so that as a rule the immense superiority of breast-feeding obtains. This should, therefore, be encouraged by every means, and not discontinued without good and sufficient reasons. The time and money required for artificial feeding, if expended by the tenement mother to secure better food and more rest for herself, would often enable her to continue nursing with advantage to her child.

14. The injurious effects of table food to infants under a year old, and of fruits to all infants and young children in cities, in hot weather, should be much more generally appreciated.

BUTTER-MAKING MACHINERY IN CANADA.

F. S. S. Johnson, Commercial Agent at Stainbridge, reports to the Department of State, September 1, 1903: Quebec and Ontario are the best butter-producing provinces in the Dominion of Canada. One can hardly travel in any direction without seeing a creamery or a cheese factory. Small farms are scarce; on the other hand the acreage to a farm is generally 200 or more, most of which is given up to pasturing and the raising of hay and grain. The average number of cattle to a farm is 30 or more. Since the establishment of creameries at almost every hamlet or village in these provinces the making of butter by hand has been done away with. I find that separators from the United States can compete with those of Canadian make, and as separators are on the free list I am surprised that our manufacturers have not taken advantage of this, as well as of the excellent market, to extend their trade in these provinces. In Canada, I am convinced, there is a splendid field for our people to operate in. The Canadians, as a rule, are anxious to try our machinery, which is superior to their own, as well as cheaper in price, and I would suggest that our manufacturers send their salesmen to these provinces to work up this trade.

THE SANITARY RELATIONS OF THE SOIL.

By Dr. Harvey B. Bashore.

Sanitarians have been paying much attention to the soil, and the more the subject is studied the more convincing does it become that the soil is one of the primal factors in health and disease.

The kind of rock that lies under our feet, or rather under our houses, is an item of no mean value; the inclination and dip of the strata are of vast importance in regard to wells and springs—the inclination may be such that filth from a far-away privy may poison a distant well.

I know of a small town, built on a heavy alluvial clay, which has no typhoid fever; another, not far distant, situated on hills of upturned shale, has typhoid endemic, and the deepest well in this town is the most polluted, this all due primarily to the character of the rock.

Cavern-bearing strata of limestone, so common in some regions, have carried poison for many a mile; and the tilted strata of gneiss on Manhattan Island make even the deepest well dangerous. If New York was underlaid by horizontal strata, like London and Paris, good drinking water could be obtained by borings.

Important as is the rock under us, yet possibly more important still is the upper layer of the soil—the first foot or so—known to agriculturalists as humus; this teeming with bugs and bacteria of all sorts is a filter plant and a sewage disposal works all in one. About this vast laboratory we know very little, but we do know that here is destroyed all manner of filth, rendering it harmless and fit to be taken up by growing plants.

Though the soil is a filth destroyer of such high value, it must not be overtaxed, and continued residence in one place, unless special care is taken, always does overtax it.

The wandering nomad overcame this by frequently changing his abode. Experience had taught him that it was unhealthy to live in one place for any length of time. The demands of civilized life require, on the other hand, that man keeps to a fixed habitation, and he then begins to sow the seeds, which his descendants of the second or third generation reap as a whirlwind, of typhoid. Yet with proper precautions all this is averted, for the amount of land usually surrounding a house will dispose of all its waste, if only care is taken.

Another factor of the soil, irrespective of filth, is moisture; this moisture being due to the absorptive power of the material, varies, of course, with different soils. In the scale of absorptive ability clay ranks first, and sand-gravel beds rank last. Hence clay is considered to be a damp, cold soil for house building, and it is a known fact that dwellers in such localities suffer much from rheumatism in its various forms, especially that form known as muscular rheumatism—a minor ailment, I know it is claimed to be; but if the lost days of labor and the annoyance caused by this trifling ailment are considered carefully, the economic value of this one disease would teach us its real importance.

It has been found that a well-drained and dry habitation is of great value to these "rheumatics," and a consequent attention to the soil in such cases, where it is possible, will be sure to reap its reward.

The ground-water—that underground sheet of water which completely fills all the interstices of the soil at a certain depth—has little to do with health save in the pollution of water supplies, and in this it does play an important part: whether a well pierces slate or limestone—whether the strata are horizontal or perpendicular—the direction and the location of the neighboring water-courses are all points of real interest to the users of well water. The ground-water is in continual motion toward the nearest streams, and for that reason a well on a hill may be poisoned by a privy in a neighboring valley.

The groundwater, too, has fluctuation of rise and fall. During a dry summer, when the water-courses are low, the ground-water is correspondingly low; likewise the cutting away of hills, etc., lower the ground-water level.

In the building and grading of a great railroad yard in a locality with which I am well acquainted, all the wells of an elevated neighboring district became dry, due, not as the inhabitants thought, to the blasting, but to the excavation of the hillside, a procedure which simply lowered the ground-water. Great changes like this, too, are likely to be followed by outbreaks of disease on account of the opening of new seepage channels.

The ground-air, which with its lessened oxygen and increased carbonic oxide is unfit for breathing, depends on the character of the soil, loose, porous soils, of course, permitting its escape much more readily than the compact and harder rocks. Special foundations and concrete basements are especially desirable over these loose soils, while over a compact alluvial clay such precautions

are not as necessary—such clays being almost impervious to air, and the clay itself acting as concrete.

More attention to the sanitary study of the soil will likely bring out new developments, and make it of more importance in the future. Lord Bacon long ago said, "He that builds a fair house upon an ill seat committeth himself to prison"—a prison of suffering and disease, may be added.

GALALITH, OR MILK-STONE MANUFACTURES.

At the Hygienic Milk Supply (Hygienische Milchversorgung) Exhibition, which was lately held at Hamburg, the Vereinigten Gummiwaren-Fabriken, of Harburg and Vienna, exhibited a number of objects which seemingly had nothing whatsoever to do with hygienic-milk supply. There were shown, nicely arranged in glass boxes, combs seemingly made of horn; cigar holders, with amber-colored mouthpieces; knives and forks, with handles similar in appearance to ebony; ferrules for umbrellas and sticks, and balls, rings, chess figures, dominoes, etc.; also a small table with an inlaid marble slab, and finally a number of thick slabs and staves with every imaginable variation of marble colors, but of considerably less weight than real marble. These objects were made of "galalith"—*i. e.*, milk stone.

Skimmed milk, in spite of its many valuable qualities, has so far been little used; it contains a considerable portion of nutritious matter—*i. e.*, 1 liter (1.05 quarts) of skimmed milk is of about equal value to a quarter of a pound of meat. It is by far too little appreciated as a cheap food for the people, hence what the German peasant cannot sell to milk-sugar factories or use for the manufacture of cheese is given to cattle and pigs as food. The principal albumenoid substance of skimmed milk, the casein, is the raw material out of which the new product galalith is manufactured. More than fifteen years ago the idea was originated to manufacture various articles like buttons, handles, ornamented plates, and colored pencils out of casein. The inventor took out a patent for a manufacturing process, which is described as follows:

Fresh casein—*i. e.*, ordinary or dried curds—were dissolved in hot soap water; to this solution the required coloring ingredients and a metallic salt were added, and a firm substance consisting

of casein and metallic soap was produced, which, by drying and pressing into molds, could be given any desired shape. It is to be supposed that the inventor had found out by continued trials that casein by addition of a metallic salt becomes brittle and softens easily in water. With a view to counteracting this latter drawback soap was added, but the articles produced thus were soft and brittle, and the invention was not a success. The chemical factory of Schering at Berlin then invented a process, the idea of which was to make casein insoluble by the addition of formaldehyde, but the disadvantage of this invention was that the articles produced distended considerably in water.

The inventors of galalith succeeded, after many troublesome trials, in doing away with the deficiencies of former methods and in using the good that was in the former ones, for the working out of an entirely new process. Their first aim was to make an insoluble union of casein by the addition of salts and acids. The substance thus obtained was dephlegmated and dried, and, finally, by the addition of formaldehyde, the galalith was obtained. To produce, for instance, a material similar to ebony, which could be used for handles of table knives, they proceeded as follows: Dissolved casein was given a dark color by the addition of soot and, with the help of a metallic salt, "acetate of lead," a slate-colored precipitate was obtained. This was mixed with water and the thin pap filled into a cloth stretched over a frame. The water becoming absorbed by the cloth, the pap contracted into a uniform, firm and dark mass; this was placed in a solution of formaldehyde and, after being dried, a product resulted which in lustre and color was equal to ebony. In this way a raw material is produced which the inventors have protected by numerous patents.

An advantage of the new product as compared with celluloid is the fact that it does not ignite so easily and is entirely odorless. Trials have proved that even when kept for weeks in water it does not distend more than the best quality of buffalo horn; after one month it had not soaked in more than 20 per cent. of water. Of late trials have been made to produce, by the addition of vegetable oils, an insulating material for electrotechnical purposes.—Oliver J. D. Hughes, Consul-General, Coburg, June 17, 1903.

Telling Fortunes.—Text: "Be not among winebibbers; among riotous eaters of flesh: for the drunkard and the glutton shall come to poverty; and drowsiness shall clothe a man with rags."—Prov. xxiii., 20-21.

MEDICAL EXCERPT.

By T. P. CORBALLY, A.M., M.D.

APPENDICITIS IN THE ARMY.—M. Chauvel presented to the Académie de Médecine ("Le Progrès Médical," Nov. 11, 1903) a very interesting lecture on appendicitis in the army. A comparison of all the operations shows:

1. The number has steadily increased during the last seven years in our military hospitals. From 49 in 1897 it rapidly increased until it was double that number in 1899; it was three times as great in 1900, and still further increased in 1901 and 1902, the last year for which statistics have been furnished.

2. The mortality after the operations has varied within relatively limited bounds; its highest rate was 20.7 per cent. in 1899; its lowest, 11.5 per cent. in the preceding year. The death rate has been progressively diminishing in the last two years, for which the rate was 12.5 and 12.7 per cent. in each, respectively.

M. Chauvel has remarked the extreme rarity of appendicitis in Algeria and in Tunisia, and explains it thus:

"The food is almost exclusively vegetable, which, united with a natural resistance largely developed for articles of intoxication that attack the lymphatic organs; the influence of climate, which is dry and warm; this seems at present to be the rational explanation of the infrequency of appendicitis in the native population of Algeria and Tunisia. Situated in circumstances that force them to a nutriment very limited in quantity and non-stimulating in quality, with but little meat, the European colonists enjoy a relative immunity from the disease. As regards our soldiers—the French—whose diet differs but little from that of the troops of the metropolis, the influence of the dry, warm temperature, which favors the functions of the skin, and the extreme rarity of grippe may be supposed to exert some beneficial results. It seems to me, however, prudent to limit the inference to a simple statement of facts."

GANGRENOUS APPENDICITIS.—M. Reynier, for the diagnosis of gangrenous appendicitis, however, insists on the difference between the local phenomena, which are mild or almost imperceptible, and the general symptoms, as pulse and temperature, which are alarming. A man twenty-eight years

of age, who on the fifth and sixth days of a crisis of appendicitis which followed several other mild attacks, presented a pulse of 120 and a temperature of 39.8 Cent., notwithstanding the application of ice and the use of mild diet, the diagnosis was gangrenous appendicitis and an immediate operation. The appendix was entirely free and resting in a reddish liquid. Examined after section it was covered with mucus of a thick, creamy character and a cavity full of thickened serum. At the time of the operation the abdomen was soft, the countenance good, the respiration normal, nothing about the patient gave rise to the suspicion of gangrenous change about the appendicitis.

M. Quénu said that the description presented by M. Reynier was true for cases of gangrenous appendicitis from its onset, but in cases of gangrenous appendicitis of secondary character, coming on in a centre of suppuration already established, the disease assumes during the earlier period the characteristics of ordinary appendicitis, and it is only secondarily that it assumes the course of a general infection.

According to M. Quénu, an early diarrhea presents one symptom of a gangrenous appendicitis, just as in some cases extremely severe pain, well diffused, may lead to the suspicion of general peritonitis.

What designates the situation of the local symptoms is the general intoxication, which is determined by the anesthesia.

TWO DWARFS BROTHER AND SISTER.—MM. Poncet and Leriche ("Gazette Hebdomadaire," Oct. 25, 1903) presented two dwarfs, the brother measured m. 1.20, the sister, m. 1.17. They were themselves children of dwarfs. They are perfectly formed. Radiography shows that the diaphyso-epiphysaires jointures are perfect. The diminutive size does not indicate any pathological condition; it is an ancestral dwarfish size which calls to mind the pygmies of olden times. The French metre is 3.28 feet, English.

LA MALADIE DU SOMMEIL.—MM. Blanchard and Brumpt presented three cases of diseased sleep ("Progrès Médical," Oct. 24, 1903). At Brazzaville, M. Brumpt had under observation 38 cases. Castellani had stated that this disease was caused by the presence of trypanosomes in very large quantities in the cephalo-rachidian liquid. In 38 cases he found the parasite 32 times. Brumpt also found them in similar proportions. The parasites swarm in the cephalo-rachidian liquid of the patients.

Two types of the sleep disease—maladie du sommeil—are found. One is characterized by marked swelling of the ganglions of the neck; it is to this form that the two negroes presented to the Académie belong. The disease always causes death more or less rapidly.

Brumpt has tried to inoculate animals with this disease. He tried the experiment on rats, mice and guinea-pigs, but so far without result; still it is possible that, as in the case of the parasite of the *magana*, the development may be very slow; on the other hand a monkey inoculated has died with all the symptoms of the disease. Unfortunately, the histological examination was not made. The death was on board a ship.

M. Laveran confirms the infectious origin of the disease and shows that the trypanosome acts somewhat like the disease of Ditton (some call this Dutton); the parasite seems to be the same, but in the disease of Ditton the parasite remains in the blood, while in the disease of sleep it passes into the cephalo-rachidian liquid. There is no distinctive characteristic yet found by which to differentiate between these two trypanosomes.

M. Chantemesse, apart from the infectious origin and the inoculation, has studied the transmitting agent (l'agent vecteur) of the disease. He shows that this seems to be a fly; the *glossina palpanis.*

M. Blanchard coincides in the opinion regarding the part taken by the *glossina.* The geographical distribution of the insect, and that of the disease of sommeil—sleep—coincide.

In America the negroes have never introduced the disease, perhaps from the fact that the fly—*glossina*—does not exist there.

ATTEMPT TO RENDER THE GUINEA-PIG ANTI-TURERCULOUS.—Attempts have been made ("Gazette Hebdomadaire," Oct. 25, 1903) in different ways to find a means of immunizing against the bacillus of Koch.

E. Levy has shown that recently the bacillus of Koch, no matter how virulent it may be, if immersed during two days or more in a dilute solution 8 per cent. of glycerine, becomes harmless for animals. Using the bacillus treated with glycerine after a time more or less short, varying from five to two days, the author inoculated guinea-pigs progressively. After the injections of the virulent cultures there results only a local suppurative lesion, while other animals so treated without the glycerine have tuberculosis developed progressively. The autopsy of the animals vac-

cinated with the glycerine preparation thirteen weeks afterward showed no symptoms of tuberculosis. There is in this case a series of incidents and experiences of great interest, and the case is one that deserves further investigation.

E. Levy, Die Moglichkeit Meerschweinchen gegen Tuberkulose zu immunisiren. Centralb. f. Bakt. 33. 9. 1903 (The possibility of protecting guinea-pigs against tuberculosis). Dr. J. Sabrazès.

THE SEAT OF EPILEPTIFORM CONVULSIONS, TONIC AND CLONIC. —M. Nino Samaja ("Progrès Médical," November 14, 1903) has employed the method of M. Battelli in order to determine if the convulsive phases as tonic or clonic which may follow after the application of the alterative current are under the influence of the different nerve centres. From these experiments the author draws the following conclusions:

1. The cortical motor zone is the exclusive centre of clonic convulsions in full-grown dogs and cats. The remainder of the cerebro-spinal axis gives for them only tonic convulsions. In the mammalia, the less elevated species in the series of animal life, as rabbits and guinea-pigs, just as in the young of dogs and cats and in the green frog, the motor layer is not the centre of convulsions.

2. The bulb or isthmus of the encephalon in the guinea-pig and the rabbit is the seat of clonic convulsions. In the guinea-pig and the green frog the insulated bulb of the encephalon is the seat of the clonic convulsive centre.

3. The medulla throughout its whole extent in all the mammiferous animals is the seat of a centre exclusively tonic: it never causes clonic convulsions. In the green frog, the medulla, on the contrary, causes clonic convulsions.

It is seen, then, that the clonic convulsive centre goes up progressively in the animal scale from the marrow to the cerebral meninges: bulbo-medullary in the green frog, bulbar or basilar in the guinea-pig and the rabbit, it becomes cortical in the full-grown dog and cat. In man, since in the case of decapitation the trunk presents no sign of convulsions, the seat of tonic convulsions is entirely basilary; that of clonic convulsions is cortical.

CIRCULATION OF THE CEPHALO-RACHIDIAN LIQUID.—M. Cathelin has studied the circulation of the cephalo-rachidian liquid ("Progrès," Oct. 31, 1903). The chorioid plexus, the secreting glands, the subarachnoidian sereuse, the reservoir and not the conductor: the liquid passes into the lymphatic circulation through

the perivascular and the thoracic canal, and falls into the left subclavian vein, then into the great circulation, to return through the chorioid plexus by means of the different vessels. The very free outflow of the cephalo-rachidian liquid after a wound of the spine very strongly favors this theory.

SUBACUTE TETANUS.—M. Blin, referring to a communication of M. Sicard at the previous session, reported a case of *tetanos subaigu* cured with chloral and antitetanic serum. The patient had strong rigidity of muscles, especially contractions of the masseters. He had from five to six attacks in 24 hours. The cause of the *tetanos* was a wound in the forearm made by the neck of a broken bottle. The incubation lasted nine days. The treatment consisted of chloral in fractional doses from six to eight grams a day and hypodermic injections of antitetanic serum. The patient had retention of urine, which required the use of the catheter; he had also rubeoliform erythema. The author does not favor subarachnoid injections.

DRINKING WATER IN THE ARMY.—M. Vallin read ("Progrès Médical," Oct. 31, 1903), on the prophylaxis of epidemics in the army, a report in which he draws the following conclusions:

1. The first and best prophylactic measure against the invasion of diseases which are epidemic and propagated by water is to provide pure water from springs well chosen and equally well protected.

2. These conditions fulfilled, it is useless to have recourse to any means of sterilizing water.

3. Without having recourse to filters, which, if well cared for, may often render great service, there is always an opportunity to use sterilizing with heat.

M. Kelsch asked that the report be printed in the "Bulletin" before the conclusions be discussed.

RHEUMATIC PAIN AND FEVER.—Dr. E. G. Evans, in an article on "Acute Articular Rheumatism" ("The Medical and Surgical Bulletin") says: "Salol is the best intestinal antiseptic we have, and antikamnia as a pain reliever is, without doubt, unsurpassed; therefore, the combination of these two remedies in the form of the well-known 'Antikamnia and Salol Tablets' affords us the ideal medicament for pain and fever in rheumatic conditions. Patients appreciate the fact that when administering antikamnia you re-

lieve the pain without giving them morphia, while the salol acts as a germicide and antiseptic, tending to ameliorate generally the symptoms of the disease. Antikamnia and Salol Tablets (each tablet contains 2½ grs. antikamnia and 2½ grs. salol) are best given in doses of two tablets every three hours until ten or twelve tablets are taken during twenty-four hours. The patient's bowels must be kept open and the diet should be light. Alcohol is contra-indicated, and water should be freely and frequently given. The bed covering should not be too heavy, but warm. Cold water packs, as well as hot fomentations, are very beneficial."

ILLUMINATING GAS IN PUBLIC SANITATION.—Lastchenkoff says (*Roussky Vratch*—"New York Medical Journal," Dec. 12) that it is very important for a city to compel the gas contractors to furnish a certain standard quality of gas that shall not contain more than definite limits of injurious substances. The chief questions are the amounts of sulphur and carbon dioxide which illuminating gas shall be allowed to contain. There should not be more than fifty grammes of sulphur in each hundred cubic meters of gas, and not more than eight per cent. of carbon dioxide. The mixture of water gas with illuminating gas should be allowed, only in such limits as do not exceed the normal limit of carbon dioxide indicated. The supervision of the gas supply should be administered by the municipal boards of health.

TO MAKE ALCOHOL UNDRINKABLE.—Those of our readers ("The American Architect," Nov. 28) who are experts in alcohol may be interested in the announcement of a competition, instituted by the Russian Minister of Finance, for the best means of making alcohol undrinkable, without lessening its usefulness in the arts. As the liquor business of Russia has, in the interest of temperance, been assumed by the Government, the solution of this problem is one of considerable importance, financially as well as industrially, and the Minister of Finance, with characteristic Russian liberality, offers a premium of fifty thousand roubles, or about twenty-seven thousand dollars, for a substance satisfying all the conditions of the programme. Each competitor must submit a memoir, setting forth the experiments which have led to his discovery, and giving the composition, properties, and methods of manufacture and use, together with a sample of not less than ten kilogrammes weight, of the substance. If several meritorious preparations are submitted, the premium may be divided among their inventors, and all inven-

tions receiving premiums are to become the property of the Government.

A HOUSE OF BEER BOTTLES.—Tonopah, Nev., aside from being famed on account of its vast mineral resources, also occupies the unique distinction of numbering among its inhabitants a man who is able to live in a glass house, and throw unlimited quantities of stones at the same time without suffering any of the serious inconveniences popularly supposed to surround such an association. Not a tree grows within sixty miles of the great mining camp, and very naturally building material and fuel bring all sorts of fancy prices, the commonest kind of lumber selling for $66 per 1,000 feet, while inferior grades of scrub cedar command $22 a cord. Consequent upon this condition, various subterfuges are resorted to in the architectural make-up of Tonopah. There are houses made of straw; of burlap sacks trimmed with blue jean overalls; of tin from five-gallon oil-cans; of dry goods and cracker box lumber; of mud, stone, tents, cloth—in fact, almost every sort of contrivance is resorted to as a makeshift for a place of habitation; but it has remained for William F. Peck, a miner, to devise a house in a class by itself. He has constructed of empty beer bottles a house 16x20 in the clear, with ceilings 8 feet high, and containing two rooms. It was built in October of last year by Mr. Peck entirely unaided, at such odd moments as he could spare from his regular duties at the mine. Ten thousand empty beer bottles were incorporated in the structure. The inside walls are plastered with mortar, which is spread to a depth sufficient to cover the protruding bottle necks, thus making a smooth surface. Mr. Peck lived all last winter in his peculiar abode with his wife and two children, a girl of seven and a boy of three years, and says, while the temperature in many residences in Tonopah reached the freezing point quite often, his family found their glass house exceedingly comfortable at all times.—"Kansas City Star."

THE USE OF THE POTATO.—According to statistics cited by Waldron, in the "Revue pour Tous," December, 1899, the potato is more largely used in Europe than any other food substance, the average amount annually eaten per capita being as follows in the different countries named: England, 242 pounds; Austria, 662 pounds; France, 697 pounds; Norway and Sweden, 739 pounds; Holland, 840 pounds; Germany, 1,298 pounds; Ireland, 1,364

pounds. The per diem consumption for England is 11 ounces per day, and Ireland, 3¾ pounds, or nearly six times as much.

PURIFYING WATER WITH OZONE.

Consul-General Hughes, Coburg, reports, July 17: Splendid results have recently been obtained at Wiesbaden and Paderborn in the purification of water by the use of ozonized air. Water of an inferior quality is thus turned into very good drinking water. Ozonizers of the Siemens type are used to treat the air.

The plant at Wiesbaden contains 48 of these ozonizers, forming duplicate groups of 24 each. A set of eight ozonizers receives an alternating current of 8,000 volts from a step-up transformer. One pole of the apparatus consists of the cooling water of the glass tube, and is earthed, while the other pole, connected with the transformers, is placed in an inaccessible position, and therefore causes no danger to the attendant. The ozonizing tubes are inclosed in a cast-iron case consisting of three parts: (1) A completely closed central portion, into which are firmly screwed the eight ozone tubes; (2) an upper part, acting as a reservoir and distributer of the air, and (3) a lower part, forming the ozone-collecting chamber. In the upper chamber, removed from all possible touch of the attendant, are fixed the terminals from the transformers. On the floor of the lower compartment are placed the high potential cylinders with their insulating glass rods, and in addition an automatic device to prevent a short-circuit through any leakage of the cooling water. This consists simply of a strip of filter paper stretched across a metal spring. If the filter paper gets moist it tears, the spring opens out and automatically places the particular ozonizer off duty.

THE KNELL OF THE FOG DEMON.

There appears, says "The Surveyor" of Nov. 27, to be no end to the uses of electricity, which enters so largely nowadays into our domestic and commercial economy. One of its latest applications is to the dispersal of fogs, and if the project proves successful, it will confer an immense boon upon the inhabitants of large cities, such as London, Manchester and Glasgow, each of which possesses its own characteristic brew. The idea is not wholly new; as long ago as 1884 Professor Lodge and another

discovered that the discharge of electricity from points into a foggy atmosphere almost instantaneously dispersed the particles of dust or water, and it has been suggested from time to time that the phenomenon might be reproduced on a large scale for the purification of the atmosphere of towns. It has, however, been left for the professor—now Sir Oliver Lodge—to demonstrate its practicability. Its realization depends upon the use of the Cooper-Hewitt mercury vapor lamps, as rectifiers, to give the unidirectional discharge which is essential to successful operation. In the course of his experiments, Sir Oliver has succeeded in maintaining a clear space of 50 or 60 yards radius in a dense fog, by means of a single mast, from the summit of which electricity was discharged by a bundle of points and a flame. Such a remarkable result from a mere experiment leads us to hope that further progress will be made, and that at no distant date the London "particular" may become a thing of the past. Be it noted that the space above mentioned is equivalent to a length of 100 to 150 yards of street 60 ft. wide, so that with a dozen such discharging centres, the Strand and Fleet street could be kept clear, even in the present state of the art. Seeing the immense financial loss entailed by a single foggy day in London, the matter is one well worthy of further investigation. It must not be forgotten, of course, that other agencies are at work in the same field; the proposed extended use of anthracite in place of bituminous coal is one of these, and there is still reason to hope that the present wasteful system of individual fires will give way to central heating from a furnace or other appliance in the cellar. Meanwhile, let us by all means see what can be done by electricity.

DISTRIBUTION OF SEWAGE ON BACTERIA BEDS.

In a paper on this subject, prepared by Dr. J. C. Thresh and Mr. Martin Priest, read and discussed at a recent meeting of the British Institute of Sanitary Engineers, the writers pointed out that it was now generally admitted that in the processes of sewage purification bacterial action was the most important factor with which they had to deal, and that the condition and quality of a sewage effluent would vary according to the different bacterial influences to which the sewage had been subjected. From the point of view of sewage purification, bacteria were divided into two classes, viz., anaërobies and aërobies, the anaërobies producing putrefaction fermentation, while the aërobies produced the true putrefaction, and it was the aërobiotic bacteria that they must

chiefly endeavor to cultivate and employ in their sewage schemes. If bacterial treatment was the main factor in sewage purification, the proper utilization of the bacteria beds was the crux of the whole problem. The best means for the distribution of sewage on bacteria beds were: First, the so-called contact beds, in which the beds are filled with sewage, allowed to stand a certain time, then run off, and the beds allowed to aërate; second, distribution by means of alternating siphons, with or without arrangements for distributing the sewage over the whole surface of the beds; and, third, the continuous, or sprinkler, system. Many installations of the contact system for some reasons had not proved satisfactory. As regards aëration, the contact beds compared very unfavorably with the sprinkler bed, because, while the contact bed is alternately filled and emptied, the continuous, or sprinkler, bed worked under constant aërobiotic conditions, with always an ample supply of oxygen. In conclusion, the writers pointed out that the bacterial system of purification merely improved the sewage from a chemical point of view and left it nearly as impure as before from the bacteriological standpoint, and possibly, therefore, quite as dangerous, so far as disseminating germs of typhoid fever, cholera and other water-borne diseases were concerned. Alderman Gibbons opened the discussion and stated that at Wolverhampton they dealt with an average flow of 2,500,000 gallons every twenty-four hours and at times a much greater quantity. At the corporation sewage farm at Barnhurst they had had a tank working on the bacteria principle for thirty years, and Dr. Frankland, who had visited it, had said that the effluent was as pure as some of the water that was used for domestic purposes in London. Dr. Reid said the Wolverhampton sewage works would compare favorably with any in England, so far as results were concerned. —*Consular Report.*

SUCCESS.

From the Washington "Star."

A man there was who failed in life,
And he awoke to find
A lull in all the stir and strife,
For he was left behind;
And friends, though some were stanch and true,
Seemed of a sudden strangely few.

Another hurried on so fast
  That none could match his pace;
He toiled until he found at last
  The farthest, topmost place;
And when he sought for rest and cheer—
He sighed, "In sooth, 'tis lonely here!"

And he who did from day to day
  His duty as he could,
Found comradeship along the way,
  And life was sweet and good.
Though sometimes touched by envy grim,
He knew not how these envied him.

RECENT SANITARY PATENTS.

730956.—Aerial Device; Charles A. Needham, New York, N. Y.

731032.—Garbage Crematory; James A. Forsyth, Atlanta, Ga.

731319.—Sanitary Tent; Syrenus A. McIntyre, Colorado Springs, Colo.

731340.—Disinfectant; George Chism, Carrollton, Ill.

731346.—Water Purifier; Eloi Delmouly, Paris, France.

733748.—Sewer, Gas and Backwater Trap and Tide and Flushing Gate; Frank W. Rathbun, San Francisco, Cal.

732740.—Exercising Apparatus; Hans M. Hansen, Quincy, Mass.

732756.—Gas Purifier; Ernest F. Lloyd, Detroit, Mich.

732897.—Apparatus for Massaging; Graziano Sartori, Berlin, Germany.

733120.—Sanitary Napkin Holder; Frederick M. Baldwin, Winterpark, Fla.

734229.—Fumigating and Disinfecting Device; George F. Hardinge, Vineland, N. J.

734252.—Lung Exercising Apparatus; Paul von Boeckmann, New York, N. Y.

736946.—Apparatus for Disposing of Foul Gases; Eugene R. Edson, Cleveland, Ohio.

737008.—Lung and Voice Developer; Peter E. Nichols, Toronto, Canada.

737258.—Catamenial Sack; Lee H. Mallalieu and Mildred Coke, St. Louis, Mo.

737413.—Formaldehyde Generator; Robert W. Johnson, New Brunswick, N. J.

737415.—Filtering Apparatus; James P. Keane, Cincinnati, Ohio.

737465.—Massage Machine; Charles Pfanschmidt and John Siefert, Chicago, Ill.

12150.—Formaldehyde Lamp; Richard P. Kuhn, Alexandria, Va.

737591.—Sanitary Face Shield; Ellen Dempsey, Albany, N. Y.

737889.—Exercising Apparatus; George Yoerger, Brooklyn, N. Y.

739809.—Filter; Chas. A. Baker, Newark, N. J.

740413.—Plumbers' Sanitary Cross; John L. Fruin, New York, N. Y.

740424.—Process of Producing Compounds for Disinfecting Purposes; Robert G. Groppler, Berlin, Germany.

740586.—Toothpick; Johan A. Ohlsson, Brooklyn, N. Y.

740714.—Apparatus for the Medication of Air; John Titus, Oyster Bay, and Wm. Titus, Old Westbury, N. Y.

740853.—Device for Closing Pedal Opening in Pianos, Pianofortes, etc.; Eduard Hilger, Aix-la-Chapelle, Germany.

741055.—Filtering Apparatus; Jos. Miller, New York, N. Y.

741173.—Sanitary Urinal; John Seidel, Milwaukee, Wis.

741228—Anti-Fouling Coating; Geo. D. Coleman, Boston Mass.

741350.—Gas Purifier Box; Ernest F. Lloyd, Fort Wayne, Ind.

741492.—Toy for Expanding the Lungs; Olaf Henrichsen, New York, N. Y.

741623.—Electric Shoes; John S. Busky, Jr., New York, N. Y.

EDITOR'S TABLE.

SANITARIAN, JANUARY, 1904.

All Communications, business and otherwise, all exchanges and all publications for review should be addressed to the Editor, Dr. A. N. Bell, 337 Clinton Street, Brooklyn, N. Y.

NEW YORK CITY TENEMENT-HOUSES.

Robert W. de Forest, Esq., the Tenement-House Commissioner of New York City, transmitted to Mayor Low a few weeks ago the first report of New York's new Tenement-House Department. In it he says:

"On January 1st, 1902, a new Department of the City Government, known as the Tenement-House Department, was created. Since that time all the tenement-houses in New York have been examined and their condition ascertained.

"Tenement conditions in many instances have been found to be so bad as to be indescribable in print; vile privies and privy sinks; foul cellars full of rubbish, in many cases of garbage and decomposing fecal matter; dilapidated and dangerous stairs; plumbing pipes containing large holes emitting sewer gas throughout the houses; rooms so dark that one cannot see the people in them; cellars occupied as sleeping places; dangerous bakeries without proper protection in case of fire; pigs, goats, horses and other animals kept in cellars; dangerous old fire-traps without fire escapes; disease-breeding rags and junk stored in tenement-houses; halls kept dark at night, endangering the lives and safety of the occupants; buildings without adequate water supply—the list might be added to almost indefinitely.

"The cleansing of the Augean stables was a small task compared to the cleansing of New York's 82,000 tenement-houses occupied by nearly three millions of people representing every nationality and every degree in the social scale.

"The task that confronted the Department was not, however, limited to this. Without organization, without employees, with all its problems before it, it was on the very day that it came into existence confronted with an organized and vigorous attack in the Legislature upon the fundamental principles of the law for whose enforcement it was created.

"Without previous records, with almost no information in re-

gard to the condition of the existing tenement-houses, it was called upon to carry out an important and far-reaching scheme for their improvement, involving the structural alteration of over 40,000 buildings.

"In the period under consideration in this report a new branch of the City Government has been organized, its machinery created, and a force of about 400 employees trained, disciplined and educated; far-reaching and important advances in legislation have been secured as a result of the Department's action, and radical and vicious attempts to break down the tenement laws defeated.

"Living accommodations for 16,768 families, or 83,840 persons, have been provided in sanitary, comfortable and decent houses, each one of which has been built according to law; notorious evasion of and non-compliance with the laws has given place to their complete, uniform and impartial enforcement; the evil of prostitution has been practically abolished in the tenement-houses; 337,246 inspections have been made; 55,055 violations filed; 21,584 repairs made to plumbing; 13,617 water-closets cleaned; 11,611 accumulations of filth removed from cellars and other parts of such buildings; 13,732 ceilings cleaned; 15,364 walls cleaned; 10,060 unsafe wooden floors removed from iron fire-escapes and new iron floors substituted; 1,701 fire-escapes erected on buildings that before were without this protection.

"The registration of 44,500 owners' names has been secured, thus fixing the responsibility for bad conditions in the tenements; contagious disease has been checked and prevented; 32,825 citizens' complaints have been investigated and the conditions complained of remedied; and an important tabulation and presentation of the population in every tenement-house block in the Borough of Manhattan has been prepared that will be of incalculable value to the city.

"The existing tenement-houses have been frequently and systematically inspected; foul cellars have had the accumulated filth of years removed; defective and unsanitary plumbing which has apparently existed for long periods has been remedied; houses unfit for human habitation vacated; hundreds of houses have been radically reconstructed and improved; light has been let into dark rooms; vile yard privies and privy sinks have been removed, and the whole sanitary condition of the city raised to a higher standard. The results of this work are clearly reflected in the reduced death rate, which in 1902 was 18.7, as compared with 20.0 in 1901, and in the first eight months of 1903 has been reduced to 18.0.

"To those who have borne the burden of the organization of the new department what has been done seems but a beginning—a first step in the endless fight against disease and death."

The report is the most comprehensive report on this subject that has ever been made by a city department, and will shortly be printed, in two volumes of about 1,000 pages. It will contain many photographs, plans, and other illustrations. One of the leading features of the report is a series of colored maps, showing population, density of population, and the nationality and the number of families living in each block throughout the tenement districts of the Borough of Manhattan.

The report includes, among other subjects, the following: Houses Unfit for Habitation, Citizens' Complaints, Periodic Inspections, Contagious Disease Inspections, Neglected Houses, Disease Houses, Condemnation of Rear Tenements, Municipal Tenements, Janitors, The Structural Improvement of the Old Houses, Privy Sinks, Dark Rooms, Fire-escapes, Prostitution, The New Law Tenement, Damp-proofing, The Enforcement of the Law in New Buildings, Legislation, Opposition to the Department and Law, The Relation of the Department to the Public, The Registration of Owners' Names, Co-operation with Other Departments, Employees, Corruption Checked, Inspector's Equipment, Women Inspectors, Departmental Instructions, Organization of the Department, Plumbing, Cellar Rooms, Bakeries, Rentals and Vacancies.

WARFARE ON MOSQUITOES.

The convention to devise and perfect means for suppressing mosquitoes, called by Governor Murphy, of New Jersey, was held in the rooms of the Board of Trade and Transportation, New York, December 16, 1903, and was attended by about forty persons identified with the movement. Governor Murphy was unavoidably absent. Robert W. de Forest, of the Charity Organization Society and president of the Tenement-House Commission, was chosen permanent president, H. Clay Weeks, secretary, and W. J. Mattheson, treasurer.

Papers were read and addresses made by more than a dozen men who, as one of them put it, "had given their blood for the cause." Although the discussion embraced mosquitoes of many different kinds and degrees of wickedness, the batteries of the experts were concentrated, for the most part, on the malarial mosquito, whose criminal alias is "Anopheles punctipennis." The

identity of this species may be established by the extraordinary length of his hind legs, which enables him to repose at right angles on a vertical wall. The common house mosquito (culex pipiens) was declared to be a troublesome "bird," but much less dangerous than anopheles.

Resolutions were adopted recommending that a provisional committee be appointed by the convention to consider the formation of a central organization of national character, with which local bodies might co-operate in conducting a gigantic mosquito crusade.

VACCINATION LAW UPHELD.

Constitutionality of Statute Enforced in Case of School Children Affirmed by Appellate Division.

The Appellate Division of the Supreme Court for the Second Department, State of New York, sitting in Brooklyn, handed down a decision November 2, upholding the constitutionality of the statute enforcing the vaccination of school children.

The decision was given by the court in the case of Edmund C. Viemeister, of the Borough of Queens, who sought to compel the Board of Education and J. H. Meade, principal of Public School No. 12, in Queens, to admit his child to school, admission having been denied because the child had not been vaccinated. It was urged on behalf of Viemeister that the statute was void, being contrary to the provisions of the Constitution.

In the prevailing opinion Justice Woodward declares that the statute does not violate the Constitution, as it operates equally upon every person who is or may desire to become a pupil in the public schools, and affords protection to all, and adds:

"However willing we might be to agree with the appellant that the practice of vaccination is attended with dangers, and that its efficacy is a matter of uncertainty, these are matters which should be properly addressed to the consideration of the Legislative Department rather than to the courts."

Justice Hirschberg also wrote an opinion sustaining the statute, declaring that it constituted a legitimate exercise of the police power.

TO SAVE LIFE AND LIMB.

If American railroad companies and mine owners and manufacturers would provide adequate safeguards for their employees, say the leaders of the movement for a museum of security ("New York Times," Dec. 8), the fatal accidents befalling such employees would be decreased more than 50 per cent. annually. It is with a

view of establishing this museum, filled with models of safety appliances, that the American Institute of Social Service is holding a series of evening meetings, the first of which was addressed last night by Dr. Josiah Strong and Dr. William H. Tolman in the Institute's rooms at 105 East Twenty-second street.

"During the last five years," said Dr. Strong, "there have been 38,890 killed on the railways of the United States. The injured in the same time have numbered 253,823. So the daily average of killed has been 21 and of injured 139. From these statistics it is seen that there are in this country to-day 51,882 persons who are condemned to death, to be executed on the railroads, within the next five years, taking into consideration the increase in travel. And you must remember that thousands of others are being killed in mines, factories, and building operations. John Mitchell tells us that two men die of injuries in the Pennsylvania anthracite mines every day.

"The Association of Industrialists in France is doing something in the line we urge, and there are several museums of security on the Continent. What we want here are working models of all safety appliances."

Dr. Strong quoted statistics to show that German and Austrian employees had profited much from the museums, and in Germany during a given period the fatalities numbered proportionately only one-fifth of those in America, while in Austria the proportion was even smaller.

He explained that the museum would contain not only models of devices to prevent accidents, but also exhibits of means to improve hygienic conditions.

Dr. Tolman's talk was accompanied by a stereopticon display. One picture showed a screen arrangement for catching any displaced belt in a factory. Another model was that of an apparatus to prevent truckmen from breaking their legs while loading barrels.

Pictures from the Charlottenburg Museum, near Berlin, for which hundreds of thousands of dollars were appropriated by the Reichstag, were shown. Among the models there were those of all sorts of hygienic clothes for men and women.

"HOW A PULLMAN CAR IS CLEANED."

Anent the unsanitary condition of sleeping-cars, described by Dr. McCormack at the recent meeting of the American Public Health Association (December SANITARIAN, p. 494), the manage-

ment of the Pullman Company has sent out this statement ("The Sun") of just what the process of cleaning a Pullman car is: "As soon as a Pullman car arrives at its destination it is entirely stripped, the carpets are beaten and aired and the interior of the car is thoroughly scrubbed with soap and water. The blankets are taken out of the car and are thoroughly blown out with compressed air at a ninety-pound pressure. It is impracticable to wash them after every trip, but they go to the laundry several times a year, which is oftener than is the case with hotel blankets. All linen is renewed each trip. Every case of sickness in a car, however trivial, is followed by the antiseptic cleansing of the section occupied by the sick person, and the entire car is sprayed with formaldehyde. As a further sanitary precaution, in the newer cars of the company, purely decorative draperies are being omitted, and the necessary ones, such as berth curtains, are being made of a lighter material which does not hold dust or odors."

On seeing this account of how the dangerous dust is scattered, instead of being destroyed, we inquired of Messrs. Pyle & Sons, of New York, whether *pearline* could be used for washing such material without danger to texture or color. They assure us that anything which can be subjected to clean warm water without injury of texture or color may be thoroughly cleansed by the use of pearline.

INTERNATIONAL CONGRESS ON TUBERCULOSIS.

Attention is invited to the announcement of this Congress on other pages. It is one of several congresses on the subject in process of organization announced for 1904 and 1905.

Dr. S. A. Knapp, of New York, in a letter published in several medical journals recently, has taken occasion to express his "deep anxiety" lest "The Bell Congress," as he presumes to designate the International Congress to be held in St. Louis next year, as at present organized, be over-exalted. "Because," he says, "it owes its inception to Mr. Clark Bell, it has, to my (*his*) knowledge, not the support of our best known men in the field of clinical medicine, hygiene, tuberculosis pathology, or tuberculotherapeutics" ("Medical Record," Dec. 5). Therefore he suggests and hopes for a reversal of the purpose and plan of the organization—to make it a mere medical congress, composed of clinicians and therapeutists—instead of public-spirited men of all professions *intent upon efforts for the prevention of tuberculosis,* for which purpose the Congress has been organized.

MONUMENT TO SERVETUS.

It is curious to think of a monument to Servetus in Geneva, but one was recently unveiled there ("American Architect"), with appropriate ceremonies, under the auspices of the Calvinist churchmen of the city. It is fair to say that Calvin, instead of tying up Servetus in his study, and privately incinerating him, as is popularly believed, simply carried out what he thought to be his duty, as the autocrat of Geneva, in sanctioning the execution of a sentence already pronounced by the lawful authority. In these days, when heresy is no longer cognizable by the criminal law, the great and good Calvin would probably be the first to rejoice at being relieved of the necessity for participating in a judicial execution, and it is as an expiation for the intolerance of the age in which he lived, rather than for personal or local intolerances, that the monument has been erected by the faithful disciples of the reformer. Some one with a taste for research might, by the way, write an interesting treatise on expiatory monuments, which are becoming sufficiently numerous to warrant special consideration. The best known one is, of course, the Chapelle Expiatore, in Paris, erected over the place of interment of Louis XVI and Marie Antoinette, which has a curious history, and next comes, perhaps, the monument to Admiral Coligny, murdered on the night of Saint Bartholomew, in front of the Oratoire, near the spot where he fell under the swords of the Catholic mob. This last is, perhaps, hardly an expiatory monument, since it was erected to a Protestant, and is attached to a Protestant church; but it is, at least, a monument to toleration, and the distance between toleration and expiation is not great.

WHY A SHIP IS CALLED "SHE."

No wonder a ship is called "she." She has shifts, stays, an apron, hooks and eyes, pins, caps and ribbons, hoods, poppets, and a husband. Then, too, the rigging costs more than the hull (whole).—H. S. L., New York Times, Dec. 18, 1903.

ADJUTANT-GENERAL BELL, of Colorado, says: "Armed or unarmed resistance by citizens of the United States against the lawful movements of the militia is treason and the punishment is death." That seems to have the true ring. It might be well if more militia commanders were made of Bell mettle.

MORTALITY AND MORBIDITY REPORTS AND REVIEWS.

HEALTH OF THE NAVY.—Report of the Surgeon-General, Chief of the Bureau of Medicine and Surgery, for the calendar year 1902:

The average strength of the active list was 31,240, an increase of 4,367 over the previous year. Complete returns were received by the Medical Department from a force of 30,249, the difference, 991, representing crews of small vessels not provided with medical officers, and officers and men on leave, or on special and detached duty at places from which medical returns in detail are not received. As reports of death are received from the total force, the figures representing that strength are used in computing ratios of death, while all other ratios are based upon the number shown by the returns of the Medical Department. Admissions to the sick list for all causes was 22,645, the ratio per 1,000 of strength being 767.63, as compared with a ratio of 766.75 for the previous year and 801.44 for the seven preceding years. There were 18,882 admissions for disease and 3,763 for injury, giving ratios of 640.07 and 125.56. The corresponding ratios for the year 1901 were 652.96 and 113.78. The daily average of patients was 1,025.93, and the ratio per 1,000 of strength 34.77, the corresponding data for the previous year being 887.21 and 33.99. The total number of sick days was 374,466, or an average of 12.05 sick days for each man in the Navy and Marine Corps, with an average duration of 16.53 days' treatment for each case. During 1901 the average number of sick days was 12.40, and the average duration of treatment per case was 16.12.

The number of persons invalided from the service (including retirements of officers for disability and transfers to hospitals for the insane) was 1,144, giving a ratio of 37.81 per 1,000 of strength. The corresponding figures for the year 1901 were 1,003 and 37.32, respectively. The ratio for the year 1902 is considerably higher than the average ratio for the period of the seven preceding years —26.17—due, no doubt, to the large number of recruits now being received to fill up the increased complement of the Navy and Marine Corps. The discharges for disability were divided into 1,001 for disease and 143 for injury, with ratios per 1,000 of strength of 33.09 and 4.72, respectively. The corresponding fig-

ures for 1901 were 875 and 128, respectively, with ratios of 32.56 and 4.76.

Deaths during the year, 211, the mortality per 1,000 of strength being 4.13 for disease and 2.62 for injury; total, 6.75. This ratio (6.75), while slightly higher than that of the previous year (6.18), is still less than the average for the seven preceding years. Twelve deaths from starvation (occurring during the campaign in Samar, in the marine department) and 6 from cholera are unusual causes that swell the death list for this year.

Among the causes of admission to the sick list, malarial diseases stand first with 1,408 admissions, wounds ranking second with 942 admissions, while epidemic catarrh, which has headed the list for the two preceding years, falls to third place, with 877 admissions. Dengue fever adds 531 admissions to malarial affections. Rheumatic and diarrheal affections rank next in prevalence with 799 and 783 admissions, respectively. Epidemic diseases increased somewhat over 1901, the admissions for the most prevalent being 681 for 1902 to 527 for 1901. The number of admissions for mumps and measles was almost twice as great as for 1901, while the admissions for diphtheria and rubella are considerably less. The admissions for smallpox are practically the same. The admissions for the epidemic diseases are: Mumps, 330; measles, 245; diphtheria, 65; rubella, 48; smallpox, 23.

Venereal diseases still cause a decided loss of efficiency, the total admissions for the year being somewhat greater than for 1901. Alcoholism also accounts for an increase in admissions. The detailed figures are: Gonorrhea, 771; syphilis, 606; chancroid, 284; alcoholism, 248.

The total admissions for injuries of various character were 2,940, being divided among wounds, 942; contusions, 706; sprains, 612; fractures, 242; hernia, 175; burns, 171; luxations, 65; drowning, 27.

The admissions for pulmonary diseases show a decrease from 1901, there being 158 admissions for pneumonia in 1902 to 185 for 1901, and 130 for pulmonary tuberculosis in 1902 to 125 in 1901. The average for organic diseases shows a decided increase; 190 admissions for heart disease during the year to 105 during 1901, and 46 admissions for nephritis to 25 for 1901.

Diarrheal affections and dysentery are still prevalent, as is typhoid fever to a less degree, the admissions being: Diarrheal affections, 783; dysentery, 176; typhoid fever, 125; the total of these, 1,084, being an increase of 135 over the admissions for 1901. Among

admissions for causes of an unusual nature are to be noted cholera (Asiatic), 11 cases, with 6 deaths; and starvation, 42 cases, with 12 deaths; all occurred in the Philippine Islands.

Upon comparing these returns with those of the previous year it appears that there has been a decided increase in the number of cases treated for malarial affections, mumps, and measles, while the other diseases prevalent in the service remain at about the same average when compared with the total strength of the force employed. The small actual increase in figures can well be attributed to the increase in the complement of the Navy and Marine Corps during the year.

Insane.—The number of patients in the Government Hospital for the Insane on June 30, 1902, 130; admitted during the fiscal year ending June 30, 1903, 44; total, 174; discharged during the fiscal year ending June 30, 1903: 14 recovered, 10 died, 1 improved—25. Remaining, June 30, 1903, 11 officers, 138 enlisted men.

Naval Hospitals.—Cases met with in the hospitals appear, as a rule, in the returns from ten stations where the disease or injury occurred. Summed up:

Remaining from last year	436
Admitted	586
Readmitted	4,616
Discharged to duty	3,791
Invalided—	
To hospital	286
From service	715
On leave	42
To Hospital for Insane	38
Deserted	47
Died	85
Continued to next year	634
Total number of sick days	308,096

Special diseases in the order of their greater prevalence:

Malarial	1,403	Contusions	706
Wounds	942	Sprains	612
Epidemic catarrh	877	Syphilis	606
Rheumatic affections	799	Dengue	531
Diarrheal affections	783	Mumps	330
Gonorrhea	771	Chancroid	284

ures for 1901 were 875 and 128, respectively, with ratios of 32.56 and 4.76.

Deaths during the year, 211, the mortality per 1,000 of strength being 4.13 for disease and 2.62 for injury; total, 6.75. This ratio (6.75), while slightly higher than that of the previous year (6.18), is still less than the average for the seven preceding years. Twelve deaths from starvation (occurring during the campaign in Samar, in the marine department) and 6 from cholera are unusual causes that swell the death list for this year.

Among the causes of admission to the sick list, malarial diseases stand first with 1,408 admissions, wounds ranking second with 942 admissions, while epidemic catarrh, which has headed the list for the two preceding years, falls to third place, with 877 admissions. Dengue fever adds 531 admissions to malarial affections. Rheumatic and diarrheal affections rank next in prevalence with 799 and 783 admissions, respectively. Epidemic diseases increased somewhat over 1901, the admissions for the most prevalent being 681 for 1902 to 527 for 1901. The number of admissions for mumps and measles was almost twice as great as for 1901, while the admissions for diphtheria and rubella are considerably less. The admissions for smallpox are practically the same. The admissions for the epidemic diseases are: Mumps, 330; measles, 245; diphtheria, 65; rubella, 48; smallpox, 23.

Venereal diseases still cause a decided loss of efficiency, the total admissions for the year being somewhat greater than for 1901. Alcoholism also accounts for an increase in admissions. The detailed figures are: Gonorrhea, 771; syphilis, 606; chancroid, 284; alcoholism, 248.

The total admissions for injuries of various character were 2,940, being divided among wounds, 942; contusions, 706; sprains, 612; fractures, 242; hernia, 175; burns, 171; luxations, 65; drowning, 27.

The admissions for pulmonary diseases show a decrease from 1901, there being 158 admissions for pneumonia in 1902 to 185 for 1901, and 130 for pulmonary tuberculosis in 1902 to 125 in 1901. The average for organic diseases shows a decided increase; 190 admissions for heart disease during the year to 105 during 1901, and 46 admissions for nephritis to 25 for 1901.

Diarrheal affections and dysentery are still prevalent, as is typhoid fever to a less degree, the admissions being: Diarrheal affections, 783; dysentery, 176; typhoid fever, 125; the total of these, 1,084, being an increase of 135 over the admissions for 1901. Among

admissions for causes of an unusual nature are to be noted cholera (Asiatic), 11 cases, with 6 deaths; and starvation, 42 cases, with 12 deaths; all occurred in the Philippine Islands.

Upon comparing these returns with those of the previous year it appears that there has been a decided increase in the number of cases treated for malarial affections, mumps, and measles, while the other diseases prevalent in the service remain at about the same average when compared with the total strength of the force employed. The small actual increase in figures can well be attributed to the increase in the complement of the Navy and Marine Corps during the year.

Insane.—The number of patients in the Government Hospital for the Insane on June 30, 1902, 130; admitted during the fiscal year ending June 30, 1903, 44; total, 174; discharged during the fiscal year ending June 30, 1903: 14 recovered, 10 died, 1 improved—25. Remaining, June 30, 1903, 11 officers, 138 enlisted men.

Naval Hospitals.—Cases met with in the hospitals appear, as a rule, in the returns from ten stations where the disease or injury occurred. Summed up:

Remaining from last year	436
Admitted	586
Readmitted	4,616
Discharged to duty	3,791
Invalided—	
To hospital	286
From service	715
On leave	42
To Hospital for Insane	38
Deserted	47
Died	85
Continued to next year	634
Total number of sick days	308,096

Special diseases in the order of their greater prevalence:

Malarial	1,403	Contusions	706
Wounds	942	Sprains	612
Epidemic catarrh	877	Syphilis	606
Rheumatic affections	799	Dengue	531
Diarrheal affections	783	Mumps	330
Gonorrhea	771	Chancroid	284

Alcoholism	248	Typhoid fever	125
Measles	245	Heat stroke	95
Fractures	242	Diphtheria	65
Heart disease	190	Luxations	65
Dysentery	176	Rubella	48
Hernia	175	Nephritis	46
Burns	171	Drowning	27
Pneumonia	158	Smallpox	23
Pulmonary tuberculosis	130		

Quarters for Sick on Shipboard.

The Department's order of April 17, 1902, directing that plans for sick quarters of all vessels under construction and undergoing extensive repairs be submitted to this Bureau for review and recommendation, has resulted in many improvements in the arrangement and construction of sick quarters on board the latest vessels completed and those whose plans have been prepared. Operating rooms, modeled on the most advanced ideas of aseptic surgery, have been provided on the largest battleships and cruisers, isolation compartments have been planned, and sick bays of a capacity proportional to the number of the crew to be cared for have been established. An improvement in the situation of sick quarters has also been brought about through the Bureau's recommendations on these matters. The old idea of placing the sick bay in the bows of the ship—the least advantageous place on a vessel for the treatment of those in need of quiet and repose—has been in a large measure laid aside. Another good result of the Department's action in this connection is, that by securing a uniformity of sick quarters, the Bureau has been able to provide uniform equipments in advance of the completion of the vessel, and has been enabled to allow it much more satisfactory outfit than would otherwise be possible.

Hospital Ships.

The history of the evolution of naval affairs in the past year furnishes many instances in which the need of hospital ships has been demonstrated. This need has been particularly brought to the front by the Department's policy of carrying on extensive drill operations, as inaugurated in the maneuvers of the combined fleets of the North Atlantic, South Atlantic, and European stations last winter in the waters of the West Indies. The Admiral of the Navy, in his report covering these operations, states that for a fleet and base having together a force of 10,000 men there

should be associated with the base, among other provisions, a hospital ship. The fleet surgeon of the European squadron, who was the senior medical officer of the combined fleets, brings out forcibly in his sanitary report the need of, and the advantages to be gained from, the services of hospital ships in peace maneuvers.

The fleet surgeon of the North Atlantic Station is equally convinced of the value of this method of solving the problem of the care of the sick of the force afloat. The senior medical officers of the Alabama and of the naval station, San Juan, P. R., add their testimony to the same purport in their reports, drawing their opinion from the lesson of the winter's work. Over 150 of the men engaged in these operations would have been transferred to a hospital ship if one had been available, and this number does not take into consideration the large number of the crew of the Panther, badly infected with malaria from their service on the Isthmus. This vessel was so crippled from sickness that her services were lost to the drills, as it was imperative that she be taken north to land the sick of her force for treatment at a naval hospital. It is believed that this would not have been necessary if a hospital ship had been within reach, to which the infected members of her crew could have been transferred.

Naval Medical School.

The first session of the medical school organized under Department's order of May 27, 1902, for the instruction and training of newly appointed medical officers in professional branches peculiar to naval requirements and in the methods of naval work as applied to their profession and in general, was completed April 4, 1903, by the graduation of the first class of twelve members.

The need of a preliminary course of instruction for the novitiate of the Medical Corps before taking up active duty was fully demonstrated in the class work, and already, in the few months since graduation that the members of the class have been actively employed, the value of this school training has been practically brought to the front.

With the completion of the new naval hospital on the grounds of the Museum of Hygiene and Medical School, provided for by action of Congress, largely increased facilities will be added to the school for practical instruction. The Bureau anticipates that during the next six years it will be possible to assemble a class of from 25 to 40 members at each session, and the outlook is most promising for furnishing the service with well-trained and

equipped medical officers to fill the corps up to the complement authorized by the Fifty-seventh Congress.

The wisdom of the establishment of the school in Washington has been satisfactorily demonstrated. The building of the Museum of Hygiene has, with some slight remodeling, proved peculiarly suited for school purposes. The laboratories are well situated and are modeled and equipped to equal any modern establishment of their class. The lecture-room and other divisions of the school building are ample in size for the purposes of the school, without any encroachment on the space used for the museum proper. In order to provide for the large number of the next class, made possible by the increase in the medical corps authorized by the last Congress, it will be necessary to make some additions to one wing of the building for the purpose of providing study and dressing-rooms, and some increase in the equipment will be necessary.

Changes in the Personnel of the Medical Corps.

In order to meet the urgent need of the service for medical officers, and to provide for the future, Congress at its last session authorized an increase of 150 numbers in the Medical Corps, 25 of which are to be appointed each calendar year. At the same time, by a wise distribution of this increase among the different grades, and a rearrangement of rank whereby rank for grade was established, it placed the Bureau in position to successfully compete with other Government services in attracting properly qualified physicians to the naval service.

Since the passage of the law, up to the end of the fiscal year 1903, 16 applicants have been successful in meeting the requirements of the examining boards, filling the vacancies caused by deaths, resignations, and retirements, and leaving 11 vacancies under the provisions of the new law. It is hoped that these 11 vacancies will be filled before the end of the calendar year. This is unprecedented in the history of the Medical Corps of the Navy, which has heretofore filled with difficulty the usual vacancies resulting from retirements and casualties.

Titles of Officers of the Medical Corps.

A dissatisfaction has existed for a long time among the members of the Medical Corps in regard to the titles which are given them in the different grades of the corps. The present titles convey no meaning as to military rank or importance of duty, and embarrassment is often the result when medical officers of the navy are brought in contact with their fellows in civil life or other

military services. Moreover, these titles are in a sense somewhat derogatory to the dignity of the office they represent, as, for example, "assistant surgeon" as applied to a professional man of 30 or more years who may be in charge of a department. The term "passed assistant surgeon" was originally applied to an assistant surgeon who had passed his examination for the grade of surgeon and was awaiting a vacancy, and no commission was issued in this grade. By time and custom it became fixed into a grade, and latterly a law was passed which completed its establishment as such. To most naval medical men it is distasteful to subordinate the professional title to the military one, but it is fully recognized, on the other hand, that a title which designates both the rank and grade is desirable. The Bureau recommends that Congressional action be asked for authority to rename the different grades of the Medical Corps now existing, as follows: In place of Surgeon-General, surgeon-admiral; and in the other grades, medical director to become surgeon-captain; medical inspector, surgeon-commander; surgeon, surgeon lieutenant-commander; passed assistant surgeon, surgeon-lieutenant; and assistant surgeon, surgeon-lieutenant (junior grade).

Reports on Navy Yards, Shore Stations and Receiving Ships show them to be, in general, in good sanitary condition. But there are some exceptions. The old barracks building at the Boston Navy Yard continues to be a chronic nuisance, as it has been for many years; with old and badly placed plumbing arrangements, difficult to keep clean and beyond repair. At the navy yard at Cavite, P. I., cholera, dengue and dysentery were epidemic during the year.—From March 31 to December 31, 1902, there were at least 300,000 cases of cholera in the Islands, with 275,000 deaths. The exact number of cases of cholera which occurred in the limits of this station cannot be stated. There were about 3,000 employees of the yard. When cases occurred in the yard they were promptly sent to the cholera hospital. At the Marine Sick Quarters dysentery was prevalent and persistent, though not of severe type. Attributed to long-continued service in the tropics.

The Naval Academy.

The total number of sick days for the past year amounted to 3,699 for an average complement of 562. As compared with the previous year, this is a reduction of 330 sick days in favor of this year. The daily average of patients for the year was 10.13, no allowance being made for the four summer months, during which

the upper three classes of midshipmen were away from the academy. Three deaths occurred: 1 from acute endocarditis and septicæmia, 1 from drowning, and 1 from typhoid fever.

In town there have been more cases of typhoid fever this year than heretofore, but on account of the proximity and accessibility of the cities of Washington and Baltimore, in which much typhoid fever exists, it is hard to say what cases were introduced from these cities and what originated here.

There is no filtering plant in connection with the city water, and contamination of the water, which is principally surface water, is at all times possible. All the water used for drinking in the midshipmen's quarters is filtered by a Pasteur filtering system. The bougies are inspected by a medical officer at least once a week during his sanitary inspection. The officers and their families are not thus protected from contaminated water. It is discretionary with them to sterilize their drinking water or not.

The introduction into every house of a small plant for the filtration of the drinking water according to the Pasteur method would involve very small expense and obtain relative security against several infectious diseases.

Now that it is universally recognized as a fact that flies and mosquitoes can be carriers of infection, it becomes necessary to provide for protection against that source of possible infection. All Government houses should have kitchen, pantry, dining-room, and bedroom windows screened against insects. These screens should be just as essential for a Government house as doors or furniture.

Reports on Cruising Ships show very considerable improvement in the sanitary requirements during recent years, but there still remain important defects, even in some of the new ships, which should be overcome, *e. g.*, the *Iowa:* "The sick-bay closet has never worked well for more than a week at a time, and should be replaced by a better form, secured to a proper foundation. The medical storeroom is too small, especially now that the outfit has been enlarged, and the quartermaster's storeroom, which is separated from it by a wire partition, should be added to it. The sanitary tank is in a coal bunker and cannot be cleaned when the bunker is full. This tank slowly fills with a deposit of grease and soap, which can only be removed with a chisel and scraper. It is suggested that there might be a small cistern or well substituted, which could be kept empty by a small steam pump constantly working. The pipes from the water tanks run through the fire-

room and ammunition passages, and the water is delivered in the galleys and pantries at a temperature of from 100° to 115° F."

The Texas.—"The natural ventilation in most of the living spaces of the crew is good; nothing can be complained of in the cabin or wardroom quarters, and the junior and warrant officers' quarters are fair. The greatest demand for air is in the steering-engine room, the evaporator room, and the firemen's washroom. In these places it is not so much a question of purity as of reduced temperature and quantity. Taking them in order, it may be said that the steering-engine room has a temperature of 110° F. to 115° F. The humidity is so great that there is no evaporation from the body. There are two small louvres but no electric fan. The amount of air supplied or exhausted is so slight as to practically amount to nothing. Those of the crew who are stationed there at sea are exhausted at the end of two hours and dread the duty."

The Oregon.—"During the long sea voyages the ship has been required to make it has been necessary to batten down hatches fore and aft, pretty much all the time, and on these occasions the steam-ventilating system has not been equal to the task of properly renewing the air below. There should be an exhaust, as well as a supply system, and the air should be driven by electric fans.—The crew's water-closets, which adjoin the space on the berth deck, where the majority of the men swing, are offensive at sea, in spite of the great care exercised in keeping them clean.

"The ship, below the berth deck, is in good condition, and is satisfactorily ventilated and fairly cool, except the dynamo room, where the temperature ranges between 130° and 145° F. at sea. This matter is under consideration and will no doubt be remedied before the ship goes to sea again.—The sick bay is inadequate in size. It should be large enough to contain 12 folding bunks at least. It has but 4 at present.

"At sea in a temperate climate, when hatches can be opened, and in port, with air ports open as well, the Oregon may be considered fairly satisfactory from a sanitary point of view. She is entirely unsuitable for tropical cruising. Temperatures of 90° and 95° F. are not at all uncommon in the wardroom officers' quarters, while in the warrant officers' quarters and in the men's quarters nearby the temperature has ranged between 100° and 105° F. day and night."

STATE OF NEW YORK.—Monthly Bulletin of the State Department of Health for October, 7,910,000: Total number of deaths,

9,786; annual death rate, 15.0; deaths under 5 years, 2,458; percentage of deaths under 5 years to total deaths, 25.0; deaths at 70 years and over, 1,724; deaths from zymotic diseases per 1,000 deaths from all causes, 123; from cerebrospinal meningitis, 21; typhoid fever, 194; malarial diseases, 12; scarlet fever, 45; measles, 27; erysipelas, 13; whooping-cough, 31; croup and diphtheria, 256; diarrheal diseases, 598; acute respiratory diseases, 968; consumption, 1,038; puerperal diseases, 87; diseases of the digestive system (not acute diarrhea), 617; diseases of the urinary system, 791; diseases of the circulatory system, 1,038; diseases of the nervous system, 1,044; cancer, 456; accidents and violence, 668; old age, 369; not classified, 1,503.

Smallpox has existed in few places till recently, and no deaths from it have occurred in the State for several months. With the advent of colder weather it has developed more widely, and in some localities unsuspected prevalence has existed for several weeks. The question has come to the State Department several times of late as to whether an embargo shall be placed against an adjoining town in which smallpox is prevalent. It would no doubt be entirely justifiable so far as the affected town is concerned, in case it is lax in the proper care of its cases, to place guards on the highways and shut off all communication with it. Self-preservation would sometimes seem to require this. But it is not recommended; first, because in certain cases where we have seen it done it has not proved to be effective as a remedial protection. But the chief reason is that it turns the public mind away from a measure of protection which is absolute to the individual and, if general, to the community, *i. e., vaccination.* The public need to have this constantly enforced. There is no other means of protection that has any comparative value.

Save in one direction compulsory vaccination is not on the statute books of this State. It is a law, however, that all unvaccinated persons shall be excluded from the public schools. This law is strictly enforced in many of our municipalities. Its constitutionality has been affirmed by the courts of the State. This has been just recently declared in a notable decision handed down by the Appellate Division of the Supreme Court, so that no question can ever arise as to its legality. The State Department of Health would reaffirm that an unvaccinated person is a menace to the public health; and to have smallpox is a crime against the community.

New York City, 3,732,903. Total number of deaths, 5,123; annual death rate, 16.01: Borough of Manhattan, 1,917,676—

Deaths, 2,708; death rate, 16.6; Borough of the Bronx, 268,341, deaths 393; 17.2; Borough of Brooklyn, 1,219,597, deaths 1,710; 15.6; Borough of Queens, 182,681, deaths 208; 13.0; Borough of Richmond, 72,608, deaths 104; 16.3.

Record of Deaths by Accident.

Commissioner Greene, of the Police Department, December 4 made public a list of figures regarding the number of deaths in New York City streets during the year 1902, in confutation of figures that, he said, have been published. He said that some papers in this city and throughout the country have published that 535 persons had been killed in the streets during 1902. This, he said, he had found to be excessive. From the reports of the Health Department, the Commissioner had found that only 365 persons were killed. Of this number, the Commissioner said, he wished to point out that 172 were killed by street railway lines. Trucks and wagons had killed 146, while automobiles only killed 9. Bicycles killed 2 and runaway horses killed 7.

CALIFORNIA.—For record of plague in San Francisco for calendar year 1902 see Public Health Reports No. 52, December 26, 1902. A summary of cases since March, 1900, when the first case was officially reported, is as follows: Calendar year 1900, cases, 22; deaths, 22. Calendar year 1901, cases, 30; deaths, 25. Calendar year 1902, cases, 41; deaths, 41. Total cases of plague from January 1 to December 11, 1903, 17. Total cases of plague same period 1902, 41. November, 1903, 4 cases; total to date, 109.

Los Angeles, 135,000.—Health report for November: Deaths, 246—32 under 5 years; death rate, 18.22. From specific infectious diseases, 74; tuberculosis, 51—"4 had lived here less than three months, 5 between two, three and six months, 3 between six and twelve months, 18 between one and five years, 2 between five and ten years, 14 over ten years, 2 life, unknown, 2."

COLORADO.—Denver, 175,000. Report for September: Deaths, 245; premature and still births, 7. Death rate, per annum, 16.80. Deaths from phthisis, 57—56 contracted elsewhere; typhoid fever, 106 cases, 13 deaths; smallpox, 9 cases; chickenpox, 3 cases; diphtheria, 50 cases, 2 deaths; scarlet fever, 24 cases, 5 deaths; measles, 3 cases; whooping-cough, 1 death. Deaths from heart diseases, 12; pneumonia, 9; bronchitis, 3; nephritis, 12; cancer, 8.

CONNECTICUT.—Bulletin for October: Deaths, 1,123; 37 less than in September and 10 less than in October of last year, and 14 more than the average number of deaths in October for the five years preceding. The death rate was 14.4 for the large towns; for the small towns, 13.8; for the whole State, 14.8. Deaths reported from infectious diseases, including diarrhea, 269—23.9 per cent. of the total mortality.

Cases of infectious diseases reported: Smallpox, Putnam, 8; measles, 255 cases in 20 towns; scarlet fever, 103 in 32 towns; diphtheria and croup, 14 in 36 towns; whooping-cough, 94 in 13 towns; typhoid fever, 165 in 38 towns; consumption, 25 in 11 towns.

DISTRICT OF COLUMBIA, 295,103—90,353 colored. Report for the week ended December 5: Deaths, 112—29 under 5 years; one more than in the previous week and 14 more than during the corresponding period of last year; 68 were white and 44 colored. Death rates, 17.3 for the whites, 25.3 for the colored, and 19.7 for the entire population; 18.3 for white, 22.4 for colored, and 19.6 for entire population were the death rates for the previous week, and 13.8, 24.3, and 17.1, respectively, were the rates for the corresponding period of 1902. The prevailing causes of death were: pneumonia, 15; diseases of heart, 13; consumption, 12; malignant growths, 9; diseases of the kidneys, 8; and apoplexy, 5. There were 5 accidental deaths—4 from burns and scalds and 1 from railroad accident.

Cases of typhoid fever continue to diminish, there being 16 reported and 30 discharged, leaving on hand at the close of the week 114, as against 289 at the corresponding period of last year. Of diphtheria, 3 new cases were reported and 2 were discharged, which increased the number under treatment to 19 in all, confined to 17 premises. Scarlet fever also was increased by 3 cases, there having been 7 new cases reported and 4 discharged, making a total of 37 under observation in 26 premises.—Smallpox, no new cases, 2 cases in hospital.

INDIANA State Board of Health bulletin, October, as compared with September.—Typhoid fever is the most prevalent disease, 78 counties reporting the disease present, and deaths were reported from 64 counties. It was also the most prevalent malady last month. Rheumatism was reported as second in area of prevalence, while diarrhea occupied this position last month, but it has

fallen this month to seventh place. The order of prevalence was: Typhoid fever, rheumatism, intermittent fever, bronchitis, tonsillitis, scarlet fever, diarrhea, diphtheria and croup, pneumonia, influenza, pleuritis, erysipelas, measles, dysentery, cholera morbus, inflammation of bowels, whooping-cough, cholera infantum, cerebrospinal meningitis.

Smallpox.—324 cases and 1 death in 38 counties. This is a decided increase in the number of cases and area as compared with the preceding month, but a decrease so far as deaths are concerned. In the corresponding month last year 298 cases were reported, with 19 deaths, in 35 counties. We have, therefore, to record an increase as far as cases and area is concerned, but a decided decrease in regard to deaths.

The total number of deaths from all causes reported was 2,573, a rate of 12. The city death rate was 15.4, and the country death rate was 10.3. Tuberculosis claimed 256 victims, the rate being 120 per 100,000. The city rate for this disease was 154, and the country rate 102.4. Typhoid fever, 160; diphtheria, 63; pneumonia, 132; influenza, 8; cerebrospinal meningitis, 25; puerperal septicæmia, 10; cancer, 105; violence, 146.

IOWA.—State Board of Health Bulletin for November reports outbreaks of infectious diseases for the preceding month: Chickenpox in Des Moines; diphtheria in 8 localities; measles in 2; scarlet fever in 13; typhoid fever in 2; smallpox, 11 cases in 6 localities.

We have received a large number of letters from Arlington and vicinity relative to an epidemic of smallpox there. One party reported 66 cases. The schools have been closed, public gatherings prohibited and business more or less demoralized. The burden of the correspondence is whether quarantine may not be "raised" at an earlier date than that prescribed by the Board. From outside sources where persons have gone from Arlington and taken down with smallpox it is alleged that quarantine is but indifferently enforced and that the disease is called "Cuban itch."

Later.—A letter from Mayor Osborn states that the doctors did recognize the disease as smallpox and so reported it, and that it was promptly quarantined. The cause of its wide spread is to be accounted for.

"It is evident that the above does not fairly represent the actual number of outbreaks that have occurred throughout the State, as there must be many such outbreaks that are not reported to the

Secretary. Every such report is carefully registered by the Secretary and published in the *Bulletin.*"

ILLINOIS.—Statement of mortality for the month of November, 1903, compared with the preceding month and with the corresponding month of 1902. Death rates computed on estimated mid-year populations of 1,885,000 for 1903 and of 1,820,000 for 1902:

	Nov., 1903.	Oct., 1903.	Nov., 1902.
Total deaths, all causes	2,124	1,962	2,008
Annual death rate per 1,000	13.71	12.25	13.41
Under 1 year	335	356	338
Between 1 and 5 years	180	180	264
Over 60 years	448	391	385
Principal causes of death—			
Acute intestinal diseases	96	171	120
Apoplexy	60	49	52
Bright's disease	148	145	114
Bronchitis	64	40	84
Consumption	192	220	185
Cancer	85	99	93
Convulsions	47	34	52
Diphtheria	80	76	82
Heart diseases	180	161	151
Nervous diseases	120	99	92
Pneumonia	333	195	267
Scarlet fever	16	11	20
Suicide	40	41	40
Typhoid fever	56	45	72
Violence (other than suicide)	125	132	119

KENTUCKY.—Annual report of the Health Department of Louisville for the fiscal year ending August 31, 1903: Our population is now estimated at 225,053, of which 182,293 are white and 42,760 are colored. Total deaths for the year was 3,782. Of this number 2,722 occurred in the white and 1,060 in the colored population. Using these figures as a basis of calculation, it will be observed that our total death rate for the past year was 16.8 per 1,000 inhabitants. The death rate as occurring in the white population was 14.9, while it was 24.78 in the colored population. "I have accounted for the high death rate in our colored popula-

tion," says the health officer, "by reason that this class of people are improvident, ignorant, uncleanly in person, and indifferent to hygienic precautions. Many of them have inherited tendencies to scrofulous and tubercular diseases. It is not surprising, then, that the death rate is much greater in the colored population than in the white. The death rate, in so far as the general prevailing diseases are concerned, varies but little from that of previous years. Consumption, as usual, was the cause of the greatest number of deaths—11 per cent. of the total mortality.

"While it is true that during the past three decades the mortality rate from this disease has constantly and considerably decreased in the United States, falling from 33 per 10,000 of population in 1871, to about 20 per 10,000 at the present time, yet this percentage of deaths from one disease alone is entirely out of proportion to what it should or would be if only the ordinary precautions for the prevention of the disease, which are known to be scientific and effectual, were exercised.

"A matter which is worthy of consideration in reference to the prevalence of consumption is the high death rate occurring from this disease in the colored race, there being at least one hundred per cent. more deaths among this class of people than occurs in the white race. In this city, where much of the domestic help is colored, is it not perfectly possible that families are endangered to a great degree from this fact? I have frequently given reasons why the general negro mortality is greater than the white. Very little is being made in this city to stay the spread of consumption. While we have an "Expectoration Ordinance," yet it is not observed as it should be, and its provisions are inadequate."

Deaths from other diseases in the order of their greater prevalence: Heart disease, 329; pneumonia, 293; inanition, 184; Bright's disease, 181; typhoid fever, 157; entero-colitis, 145; cancer, 134; apoplexy, 121; meningitis, 101; paralysis, 98; bronchitis, 96; infantile convulsions, 80; asthma, 67; diphtheria, 57; gastritis, 57; peritonitis, 56; dysentery, 38; septic diseases, 38; nephritis, 36; marasmus (infantile), 32; obstruction of the bowels, 31; cirrhosis of liver, 30.

LOUISIANA.—New Orleans, 310,000—77,714 colored. Report for November: Total deaths, 618—356 colored. Under 5 years, 70 white, 53 colored. Death rates: white, 19.13; colored, 37.01: 23.92. Deaths from typhoid fever, 2; intermittent fever and malarial cachexia, 10; consumption, white, 42, colored, 43; cancer,

white, 17, colored, 6; organic heart diseases, 32 white, 29 colored; Bright's disease, white, 31, colored, 18.

MICHIGAN.—The Secretary of the State Board reports for four weeks, ending November 28, compared with the average for November in the 10 years, 1893-1902, smallpox was more than usually prevalent; and intermittent fever, erysipelas, inflammation of bowels, remittent fever, cholera morbus, whooping cough, measles and cholera infantum were less than usually prevalent. The diseases which usually cause the most sickness in Michigan at this time of the year were slightly less prevalent in the November just passed than the average for November in the preceding ten years.

Of the most dangerous communicable diseases, meningitis was reported present at 4 places; whooping cough at 16 places; measles at 31 places; smallpox at 53 places; diphtheria at 80 places; scarlet fever at 122 places; typhoid fever at 154 places; and consumption at 193 places. Reports from all sources show meningitis reported present at 4 places less; whooping cough at 3 places less; measles at 10 places more; smallpox at 11 places more; diphtheria at 3 places less; scarlet fever at 11 places more; typhoid fever at 31 places less; and consumption at 49 places less than in the preceding month.

Deaths reported to the Secretary of State for the month of November, 2,628—1 less than for the preceding month. Death rate, 12.9. Deaths of infants under 1 year, 418; 1 to 4 years, inclusive, 171; and 789 of persons over 65 years of age. Important causes of death were as follows: Pulmonary tuberculosis, 158; other forms of tuberculosis, 27; typhoid fever, 80; diphtheria and croup, 112; scarlet fever, 14; measles, 7; whooping cough, 28; pneumonia, 206; cancer, 140; accidents and violence, 194.

MINNESOTA.—Minneapolis, 240,000. Report for October: Deaths, 170—25 under 5 years. Annual death rate for twelve months ending Oct. 31, 19.59. Deaths from typhoid fever, 7; consumption, 19; cancer, 17; organic heart disease, 10; pneumonia and broncho-pneumonia, 13; Bright's disease, 13.

St. Paul, 175,000. Report for October: Deaths, 119—26 under 5 years; death rate, 7.93. Deaths from consumption, 15; pneumonia, 7; cancer, 7; typhoid fever, 2; scarlet fever, 2.

MISSOURI.—St. Louis, 645,000. Report for October: Deaths, 817—79 under 5 years; annual death rate, 12.66. Deaths from

zymotic diseases, 112; scarlatina, 8; diphtherian croup, 16; whooping-cough, 6; typhoid fever, 29; remittent fever and congeners, 17; diarrheal diseases, 20—17 under 5 years; cancer, 34; phthisis, 71; bronchitis, 33; pneumonia, 40; other diseases of the respiratory organs, 27; diseases of the circulatory system, 70; Bright's disease and nephritis, 40; accident, 45.

NEW JERSEY.—Hudson County (Jersey City and environs), 421,692. Report for October: Deaths, 594—176 under 5 years; death rate, 16.9. Deaths from croup, 6; diphtheria, 16; scarlet fever, 3; whooping-cough, 2; typhoid fever, 6; diarrheal diseases, 12; all zymotic diseases, 58; phthisis, 70; bronchitis, 11; pneumonia, 58; cancer, 12; violence, 35; still births, 47.

Newark, 266,000. Report for the week ended December 5: Deaths, 96—24 under 5 years; death rate, 18.76. Deaths from contagious and infectious diseases, 22; diphtheria, 4; consumption, 11; still births, 9; cancer, 7.

In virtue of recent legislation, the State has been divided in 445 sanitary districts, and the local authorities in each district are empowered to take active measures for the protection of the public health, but in only a small number of these districts is an inspector employed who has received instruction in the art of public hygiene. To the end that local boards of health may be enabled to secure the services of capable health officers and trained sanitary inspectors, the Board of Health of the State of New Jersey is authorized to cause examinations to be made by such persons and at such times and places as it may appoint, and under such rules and regulations as it may adopt, for the purpose of determining the qualifications of applicants for license as health officers and sanitary inspectors; every such examination shall be in such subjects and conducted in such manner as the Board of Health of the State of New Jersey shall direct, and every applicant whose examination shall be approved by said State Board shall receive a license as health officer or sanitary inspector as provided.

The service has been organized accordingly. Rules and regulations providing for and governing examinations for license to serve as health officers and sanitary inspectors are supplied by Henry Mitchell, M. D., Secretary, Trenton.

NORTH CAROLINA.—Bulletin of mortality for October summarizes reports of 26 towns, with aggregate population 154,200: white, 90,350, colored, 63,850; aggregate deaths, respectively, 114,

144: 258; death rates, 15.1, 27.1: 20.1. Deaths: from consumption, white, 9, colored, 20: 29; heart diseases, white, 11, colored, 12: 23; diarrheal diseases, white, 12, colored 12: 24; typhoid fever, white, 4, colored, 5: 9; deaths under 5 years, white, 37, colored, 56: 93; still born, white, 2, colored, 14: 16.

OHIO.—Cleveland, 420,000. Report for October: Deaths, 459—70 under 5 years; annual death rate, 13.11. Deaths from typhoid fever, 22; diphtheria and croup, 29; smallpox, 1; tubercle of lungs, 37; pneumonia, 29; cancer, 16; heart diseases, 29; Bright's disease, 18; diarrhea and enteritis (under 2 years), 16; early infancy congenital icterus, debility, etc., 32; senile debility, 14; still births, 42.

PENNSYLVANIA.—Philadelphia, 1,378,624. Report for week ended December 5: Deaths, 451—99 under 5 years. Deaths from Bright's disease, 4; consumption, 52; diphtheria, 12; croup, 2; diseases of the heart, 39; typhoid fever, 10; nephritis, 23; pneumonia, 61; cancer, 24. *Smallpox* increasingly prevalent; 99 cases, 15 deaths.

Pittsburg, 354,000. Report for the week ended December 5: Deaths, 154—54 under 5 years; annual death rate, 22.62. Deaths from diphtheria and croup, 6; whooping-cough, 2; smallpox, 6; typhoid fever, 11; tuberculosis, 11; pneumonia, 36; cancer, 3.

The Typhoid Fever in Butler.

Dr. George A. Soper, engaged by "The Engineering News" to investigate the typhoid epidemic at Butler, Pa., and its causes, will report that the epidemic has by no means attained its culmination, about 50 per cent. of the cases not having reached the critical stage.

In three weeks there were 1,000 cases, and up to Dec. 14 1,247 cases and 51 deaths had been reported. The epidemic he attributes to the suspension of the mechanical filtration of the city water supply.

The "New York Tribune," December 6, in an article dealing with the matter, says: "The fact that Butler's sewage drains into Conequenessing Creek has given rise to a problem which the Federal authorities have deemed of sufficient importance to investigate. There are several small towns and boroughs below Butler that take their water from the creek, and doctors agree that immediate steps must be taken to prevent the spread of the disease to these places. Dr. John F. Anderson, acting director of the hygienic laboratory of the Marine Hospital Service, has been sent

to Butler from Washington to investigate the situation there and to judge of the possibility of the disease spreading to other States."

PORTO RICO, 953,943.—Report for October: Deaths, 2,026—753 under 5 years. Annual death rate, 24.4. Still births, 155; cerebrospinal fever, 13; diphtheria, 5; typhoid fever, 5; pneumonia, 34; puerperal fever, 11; diarrheal diseases, 28; anæmia, 604; bronchitis, 83; heart diseases, 17; tuberculosis, 151; diseases of the nervous system, 29; violence, 13; undefined diseases, 1,029.

UTAH.—Salt Lake City, 75,000. Report for October: Deaths, 50—11 under five years. Annual death rate, 12.61. Deaths from typhoid fever, 6; tubercle of lungs, 1; cancer, 3; organic diseases of the heart, 6; pneumonia, 3; Bright's disease, 3; senile debility, 2.

WASHINGTON.—Seattle, 125,000. Report for November: Deaths, 97—19 under 5 years. Annual death rate, 9.24. Deaths from tuberculosis, 11; typhoid fever, 4; diphtheria, 2; organic heart diseases, 15; Bright's disease, 7; cancer, 1.

WISCONSIN.—Milwaukee, 315,000. Report for October: Deaths, 323—98 under 5 years; annual death rate, 12.07. Deaths from typhoid fever, 6; diphtheria, 7; phthisis, 28; pneumonia and broncho-pneumonia, 26; cancer, 22; organic heart disease, 25; diarrheal diseases, under 2 years, 20; Bright's disease, 17; congenital debility, 21; violence, 28; accidents, 19.

Report for twelve months ended April 13, 1903: Births, 7,406, as against 7,415 for 1901.—Deaths, 3,796; death rate, 12.65 on an estimated population of 300,000. For the year 1901 the number of deaths was 3,833, representing an annual death rate of 12.99. Within the last ten years the mortality rate of the city has been lowered from 20.25 in 1892 to 12.65 per 1,000 in 1902.

Diphtheria.—There were 455 cases, with 83 deaths, a percentage of 18.2, as against 483 cases with 100 deaths, a percentage of 20.7, for the year 1901.

Smallpox.—261 cases, with one death—the largest number of cases for one year since the great epidemic of 1894.

Tuberculosis.—Cases seem not to have been reported; deaths, 395, as compared with 473 in the preceding year.

Typhoid Fever.—208 cases, with 48 deaths; in the preceding year, 205 cases, with 63 deaths.

OBITUARY.

Dr. ROBERT WOOD MITCHELL, aged 71, one of the most prominent physicians in the South, died at his home in Memphis, Tenn., Nov. 2, 1903, from heart disease. He had been ill with pneumonia, though heart disease was the immediate cause of his demise.

Dr. Mitchell earned for himself the title of "Hero of the Epidemics" through his courage and ability in nursing yellow fever patients in the scourges which visited his city. He was a notable figure in the yellow fever epidemic of 1878 and 1879, and braved all the terrors of the plague in administering to the wants of the stricken. He organized the Memphis City Hospital before the Civil War, and during this struggle was successively surgeon of a Tennessee regiment, brigade and division surgeon. He was a member of the Congressional Committee appointed to look into the causes of yellow fever, and subsequently a member of the National Board of Health.

Kind, genial, courtly, gentle and lovable, in all the walks of life, as a citizen, as a soldier, and as a member of the medical profession, he was universally liked and highly esteemed by all who knew him.

From the "Record Blank," filled out by himself in his application for membership in the Association of Medical Officers of the Army and Navy of the Confederacy, we learn that he was the son of a Confederate soldier, and was born in Madison county, Tenn., August 26, 1831. He entered the military service of his State as Assistant Surgeon of the Thirteenth Tennessee Infantry, and when transferred to the Confederate States service was promoted Surgeon of the Fifteenth Tennessee Infantry, subsequently Senior Surgeon of Preston Smith's Brigade, and Chief Surgeon of Clark's Division. He served temporarily with Vaughan's Brigade, and for a short while on the staff of General N. B. Forrest. He graduated in medicine at the Medical Department of the University of Louisiana in 1856.

INTERNATIONAL CONGRESS ON TUBERCULOSIS.

TO BE HELD OCT. 3D, 4TH AND 5TH, 1904, UNDER THE AUSPICES OF THE AMERICAN EXPOSITION, ST. LOUIS, AND OF THE AMERICAN CONGRESS ON TUBERCULOSIS.

The Committee on Organization of the International Congress on Tuberculosis appointed by the Hon. David R. Francis, President of the Universal Exposition, St. Louis, 1904, met at the Press Club in the city of New York on the 11th day of November, 1903, and took the preliminary steps to organize an International Congress on Tuberculosis.

Nearly every member of the committee was present or represented by proxy. It was unanimously resolved to organize an International Congress under the following name: "American International Congress on Tuberculosis, to be held October 3d, 4th and 5th, 1904, under the auspices of the Universal Exposition, St. Louis, 1904, and of the American Congress on Tuberculosis."

The present officers of the American Congress on Tuberculosis were, with a few changes and exceptions, elected to the corresponding offices in the American International Congress on Tuberculosis, as follows:

HONORARY PRESIDENTS.

LAY:	MEDICAL:
Hon. John Hay,	Prof. Dr. Maurice Benedikt,
Hon. Gen. Russell A. Alger,	Dr. A. N. Bell,
Hon. Ex-Judge A. H. Dailey,	Prof. Charles H. Hughes,
Hon. Judge C. G. Garrison,	Gen. Presley M. Rixey,
Hon. Stephen B. Elkins.	Gen. Nicholas Senn.

COUNCIL.

Moritz Ellinger, Esq., Chairman.
J. Mount Bleyer, M.D., N. Y. City.
A. P. Grinnell, M.D., Vermont.
H. Edwin Lewis, M.D., Vermont.
Richard J. Nunn, M.D., Ga.
W. F. Drewry, M.D., Va.
M. K. Kassabian, M.D., Penna.
J. W. P. Smithwick, M.D., N. C.

OFFICERS.

President—E. J. Barrick, M.D., Toronto, Ontario.
First Vice-President—F. E. Daniel, M.D., Austin, Texas.
Second Vice-President—Ex-Chief Justice L. Bradford Prince, Santa Fé, N. M.
Third Vice-President—Dr. Charles K. Cole, Helena, Mont.
Fourth Vice-President—Dr. Sofus B. Nelson, Pullman, Wash.
Fifth Vice-President—Dr. A. M. Linn, Des Moines, Iowa.
Secretary—Samuel Bell Thomas, 116 Nassau St., New York.
Treasurer—Clark Bell, 39 Broadway, New York.

VICE-PRESIDENTS-AT-LARGE.

His Worship Mayor Beck, London, Ontario.
Charles G. Hicks, M.D., Dublin, Ga.
Wm. Bayard, M.D., St. John, N. B.
H. Edwin Lewis, M.D., Burlington, Vt.
A. C. Bernays, M.D., St. Louis, Mo.
J. Mount Bleyer, M.D., New York City.
T. M. McIntosh, M.D., Thomasville, Ga.
Alexander Mack, M.D., Hawkinsville, Ga.
Col. E. Chancellor, M.D., St. Louis, Mo.
Wm. F. Brunner, M.D., Savannah, Ga.
T. D. Crothers, M.D., Hartford, Conn.
Judge Abram H. Dailey, Brooklyn, N. Y.
Ex-Sen. Henry D. Winton, Hackensack, N. J.
J. A. McNeven, M.D., Gibbonsville, Idaho.
A. E. Osborne, M.D., Eldridge, Cal.
J. C. Schrader, M.D., Iowa City, Iowa.
J. H. Tyndale, M.D., Lincoln, Neb.
Hon. Moritz Ellinger, New York City.
Juan A. Fortich, M.D., Cartagena, Colombia, S. A.
R. F. Graham, M.D., Greely, Colorado.
A. P. Grinnell, M.D., Burlington, Vt.
Capt. H. D. Snyder, M.D., Governor's Island, N. Y.
Thos. Bassett Keyes, M.D., Chicago, Ill.
Health Commissioner John K. Simon, St. Louis, Mo.
Luis H. Labayle, M.D., Leon, Nicaragua.
W. F. Morrow, M.D., Secretary State Board of Health, Mo.
Louis Leroy, M.D., Nashville, Tenn.
Dr. Eduard Liceaga, City of Mexico.
Dwight S. Moore, M.D., Jamestown, N. Dak.

Wm. H. Murray, M.D., Plainfield, N. J.
T. D. Barber, M.D., Charlestown, W. Va.
C. S. Ward, M.D., Warren, Ohio.
Prof. S. H. Weeks, M.D., Portland, Me.
W. B. Outten, St. Louis, Mo.
Vice-Presidents of States' Representatives will be announced later.

BOARD OF EXECUTIVE OFFIÇERS.

Clark Bell, Esq., Chairman.
E. J. Barrick, M.D., President.
Moritz Ellinger, Esq., Chairman of Council.
Samuel Bell Thomas, Secretary.
Standing Committees not yet announced.

It was unanimously resolved that the Congress be open to the legal, medical, and all other professions, judges, philanthropists, scientists, statesmen, legislators, and all citizens interested in averting the ravages of the dread disease, and that they be invited to co-operate and become members of the body.

All the Standing Committees as organized in the American Congress on Tuberculosis were made the Standing Committees in the International Congress.

The same power, authority, and duties that had been conferred upon the Board of Executive Officers in the American Congress on Tuberculosis, and upon its council and management, were adopted and conferred upon the same officers and committees in the International Congress.

The Board of Executive Officers were instructed to extend invitations to eminent citizens, societies, and organizations, both at home and abroad, to co-operate and unite with the International Congress, who are in sympathy with its aims and objects.

The dues of members for the year 1903 were fixed at the sum of one dollar.

All members of the American Congress on Tuberculosis who had paid their dues were, by unanimous vote, made *ipse facto* members of the International Congress, and all members hereafter enrolling in the Congress were entitled to receive the "Medico-Legal Journal" (Vol. 21), which is the organ of the body and contains its proceedings, at half price, $1.50, payable in advance.

It was moved and carried that the Board of Executive Officers take into consideration the propriety of increasing the number of

the Honorary Presidents of the American International Congress on Tuberculosis and report their conclusions at a future meeting.

It was unanimously resolved that the propriety of inviting delegates from other governments outside of and beyond the Western Hemisphere to the Congress be referred to the Board of Executive Officers, with power, and that they report their action and recommendations at a future meeting.

It was resolved that the organization of the Standing Committees on the same plan and basis as that adopted by the American Congress on Tuberculosis be referred to the Board of Executive Officers, with power, and that they be instructed to report their action on the same at a future meeting.

It was further unanimously resolved that the Board of Executive Officers were authorized and empowered, in their discretion, to make any changes in any of the officers and committees of the American International Congress on Tuberculosis as they deem, by unanimous action, to be for the best interests of the body in the accomplishment of its mission, and to that end they be empowered to make such changes, by unanimous action, in the autonomy of the Congress and basis of organization as they should see fit at any time to adopt by unanimous vote.

It was moved and seconded that the Chairman of the Committee, the President of the Congress, and the Secretary of the Committee on Organization be named a committee, with power, as to the advisability of increasing the number of the membership of the Committee on Organization, with a view of having it more representative in character of an international body.

The Chairman of the Committee on Organization laid before the committee a communication from Howard J. Rogers, Director of Congresses, informing the committee that Surgeon-General Nicholas Senn, of Chicago, Ill., and Dr. Thomas Darlington, of New York, had been added to the Committee on Organization.

This action was approved by the committee, and Dr. Darlington took his seat in the committee.

The committee elected as its secretary, Thomas Darlington, M.D., and as its treasurer the chairman, Clark Bell, Esq.

CLARK BELL,
Chairman Committee on Organization.
D. J. BARRICK, M.D.,
President.
THOMAS DARLINGTON,
Secretary Committee on Organization.

BOOK REVIEWS.

JAPANESE PHYSICAL TRAINING: The System of Exercise, Diet and General Mode of Living that has made the Mikado People the Healthiest, Strongest and Happiest Men and Women in the World. By IRVING HANCOCK, author of "Life at West Point," "Tales from Luzon," "What One Man Saw," etc. Illustrated. 12mo. Pp. 156. New York and London: G. P. Putnam's Sons.

A historical sketch of Japanese physical culture from most ancient times—so ancient, the author tells us, that its origin dates before the time when the authentic history of these people began, which they have retained while they have adopted from Western civilization everything that they consider to be necessary to their national development. "They have done more, for, whereas *jiu-jitsu* was taught at one time to the aristocratic classes only, it is taught now to all of the people of *Dai Nippon* who wish to acquire it. The value of *jiu-jitsu* is proven by the fact that the Japanese while a diminutive race, possess the greatest endurance of any people on earth."

That the Japanese are the healthiest and strongest people on earth are pretty strong expressions, and if so, they should be the longest lived, but for this information is lacking. However, besides the very thorough system of physical exercise universally taught and practiced by them there is enough said about its adjuncts, personal and domiciliary cleanliness, taken altogether, to fully justify the author's conclusion with regard to their healthiness and strength, and that they are probably proportionally long lived.

There are some six systems of *jiu-jitsu* (the collective term of their physical training) taught, which the author describes and illustrates with sufficient detail to be easily understood; the aim being to give a perfect, composite whole of the essential principles of health and of the tricks of attack and defence that are needed by the perfect physical man or woman. Physical weakness or long illnesses in Japan, he tells us, are considered to be the misfortunes of only the very aged. The Japanese look upon lack of strength as being a freak or an eccentricity. He attributes all this to the exhilarating, life-giving work of the *jiu-jitsu*, which re-

quires four years' time for its mastery, each step to be taken up thoroughly in its order. Among the plates, which add much interest to the book, are two Japanese models of extraordinary strength, who posed for the illustrations—they look it.

DISEASES OF METABOLISM AND NUTRITION.—By Prof. Dr. CARL VON NOORDEN, Physician in Chief to the City Hospital, Frankfort, A.M. PART IV, THE ACID AUTOINTOXICATIONS. Pp. 80. Price 50 cents. New York: E. B. Treat & Co.

Uniform in style with the previous parts before reviewed. It describes the derangements of metabolism which result in an overproduction of acid, thus endangering the proper degree of alkalinity of the blood. Shows how acid autointoxication occurs, and the pathological results, and the necessity for physicians who would treat chronic conditions successfully to keep a close and intelligent watch upon the digestion, excretion and assimilation of their patients. The cause of diabetic coma is described: the accumulation of acids in the body; and that it is upon this theory that the alkali treatment of diabetic coma is based. A concise summary of knowledge upon a most important subject of practical utility to all physicians.

A NON-SURGICAL TREATISE ON DISEASES OF THE PROSTATE GLAND AND ADNEXA. By GEORGE WHITFIELD OVERALL, A.M., M.D., formerly Professor of Physiology in the Memphis Hospital Medical College. 12mo. Pp. 207. Illustrated. Chicago: Rowe Publishing Co.

A treatise based upon extensive observation and much clinical experience in the use of medicines, electrolysis, cataphoresis and mechanical ingenuity, in the treatment of one of the most obstinate of diseases. The author does not wish, however, to convey the idea that he limits the treatment entirely to these means, for there are some neglected cases in which the use of the knife becomes indispensable. But he very explicitly states the advantages of the treatment which he advocates, in comparison with the too common surgical treatment and the not infrequent irremediable result in the event of failure of surgical operation. His contention is all the more forceful and commendable because of the facile impunity with which the knife is nowadays resorted to on account of confidence in antiseptic procedure. We take pleasure in commending it to all physicians as a most timely and practical treatise.

QUIZ-COMPENDS, DISEASES OF THE EAR, NOSE AND THROAT. By JOHN JOHNSON KYLE, B.S., M.D., Lecturer on Otology, Phrenology and Laryngology, and Assistant to the Chair of Pathology in the Medical College of Indiana, etc. 12mo. Pp. 180, with 85 illustrations. Price 80 cents. Philadelphia: P. Blakiston's Son & Co.

Admirably suited to its purpose; comprehends the gist of the best thoughts upon the subjects of which it treats.

DISEASES OF THE HORSE: SPECIAL REPORT BY DRS. PEARSON, MICHENER, LAW, HARBAUCH, TRUMBOWER, LIAUTARD, HOLCOMBE, HUIDEKOPPER, STILES and ADAMS. Revised Edition. Pp. 600. U. S. Department of Agriculture. Bureau of Animal Industry, Washington: Government Printing Office, 1903.

This new edition of the Report on Diseases of the Horse, prepared under the direction of D. E. SALMON, D. V. M., Chief of the Bureau of Animal Industry, four years ago, is doubtless because of the excellence of the work which THE SANITARIAN remarked upon at the time of the first issue, and in virtue of *Joint Resolution* of Congress providing for the publication of two hundred thousand copies of the Special Report on Diseases of the Horse, as follows:

"That there be printed and bound in cloth two hundred thousand copies of the Special Report on the Diseases of the Horse, the same to be first revised and brought up to date, under the supervision of the Secretary of Agriculture, one hundred and twenty-eight thousand for the use of the House of Representatives, sixty-four thousand copies for the use of the Senate, and eight thousand copies for the use of the Department of Agriculture. Approved, June 24, 1902."

This special issue seems to be restricted to the purpose indicated, inasmuch as it appears that the Department has no copies for general distribution. This is to be regretted, for notwithstanding the apparently large issue to members of Congress for distribution, as the excellency of the work becomes more generally known the demand for it will greatly exceed this source of supply. It is incomparably so superior to any other work in the English language on the subject that the demand for it will soon be very urgent.

THE NEW YORK POST-GRADUATE HOSPITAL REPORT, 1903, is a particularly instructive and elucidative report on the best hospital

conditions. In addition to the details of the personnel, arrangement and privileges of the institution, the quarters, wards, operating room, roof-garden, etc., are beautifully illustrated. There are twenty private rooms in which pay patients may be attended, if they are under the care of the Attending Physicians and Surgeons of the Post-Graduate Hospital.

The Dispensary of the hospital is exclusively for those unable to pay for medical and surgical advice.

MEMORIAL HOSPITAL, RICHMOND, VA. Incorporated October 13, 1899; opened for patients August 1, 1903: designed to meet the requirements of every class and every condition. Its aim is to relieve suffering humanity by every means known to medical science. In order that its benefits may be enjoyed by all, it has established two departments, one for pay patients, who are treated in private rooms, and one for charity patients, who are treated in wards. There is no profit to be derived from the institution, and the number of free beds will be increased as rapidly as its finances will allow.—Mr. E. Randolph Williams, Secretary.

OPENHEIMER INSTITUTE.—A brochure of twenty pages, embracing list of the directors, general statement of the history, development and work of the Institute and of the Women's National Auxiliary. The results it has obtained in the treatment of alcoholism have secured the confidence of a large clientele among the medical profession of New York and other cities, and gained the confidence and indorsement of many clergymen and other professional men throughout this country.

"Every patient is carefully examined by competent medical authority as to physical condition and history. He is then treated personally as his symptoms demand, and for this purpose physicians of long experience in general practice and trained for this special work at the Institute are in attendance."

At a recent meeting of the Board of Directors the Women's National Auxiliary was organized to take charge of, administer and assist in the charitable work to be done by the Institute; to spread knowledge of it and to temporarily look after those who have been treated in bettering their physical and moral conditions, either by co-operation with the various existing organizations or otherwise.

For general information in regard to the Institute, write or apply to the executive offices, 170 Broadway, New York. For information concerning the philanthropic and charitable work of the

Institute, apply to the Women's National Auxiliary, room 401, Fuller Building, Fifth avenue, New York.

CONTEMPORARY LITERATURE.

JEFFERSON'S EMBARGO.

No other President ever exercised such hypnotic sway over Congress as Jefferson did in that crisis. Said the Federalist John Quincy Adams, then in the Senate, in advocating the first of Jefferson's bills: "The President has recommended this measure on his high responsibility. I would not consider. I would not deliberate. I would act." This was in the closing days of 1807. The Senate acted by passing, a few hours later, the bill, one of the most disastrous to private interests ever placed on the National Statute Book, which was also rushed through the House. The object was to protect American sailors, shippers, and ship-owners and to peacefully coerce the belligerents into respect for American rights. This was magnificent, but as Jefferson neglected to prepare for war in case war could not be abolished by his plan, it was not sense. The orders in council and the decrees meant risk for American commerce. The embargo meant ruin or rebellion. America, and not the belligerents, was the chief sufferer. George III rejoiced at the embargo as a means of crippling American commerce, of which England was jealous.—Charles M. Harvey, in the December "Atlantic."

THE JOY OF LIVING.

"We know but little of joy; and as for the joy of living, most of us have missed that altogether"—the lack of happiness in the world and the unreasonableness of such a state of affairs is the subject of an inspiring paper by Lillie Hamilton French, in the January "Delineator." Although the writer lays much stress upon the non-existence of happiness, she points a way to individual betterment of conditions. Many people sink under a burden of care, whereas care should be an uplifting influence, "for the saddest of life is not found where Care is, but there where Love is and Care is denied." There is that in life to recompense for sorrow, however great; the trouble is that many cannot see the good about them everywhere, in Nature. Therein is the secret of all joy, is Miss French's message—a right understanding of life, looking on the bright side of things. "Yet even when your strength dies with

discontent—and here is the very joy of life itself—Nature, with its remedial forces, will bring strength back to you, for Nature, which is life, goes on eternally, renewing all things and always ready to renew you."

"GO NOT TOO FAR."

Go not too far—too far beyond my gaze,
Thou who canst never pass beyond the yearning
Which, even as the dark for dawning stays,
Awaits thy loved returning!
Go not too far! Howe'r thy fancies roam
Let them come back, wide-circling, like the swallow,
Lest I, for very need, should try to come—
Yet find I could not follow!
—Florence Earle Coates, in the December "Atlantic."

WAGNER'S "PARSIFAL."

Richard Wagner completed "Parsifal," his last work, only a few months before it was produced, although he had been working on the idea for many years. The first conception of it is said to have come to him as early as 1857. In 1877, he had finished the poem. During the following year he completed the music of the first act. On the instrumentization of the whole opera he worked for three years, and finished it in January, 1882.

Wagner found the story in that field of mediæval lore and mysticism that his studies for his earlier operas had laid bare to him. From the German Minnesinger, Wolfram von Eschenbach, who wrote the epic "Parzival," and from Chétrien de Troyes, he drew most of the material, which he used, with the privilege of the artist, in the way that appealed to him most strongly. "Parsifal" thus became his own in the form in which he gave it to the world.

The story is so vague and symbolic that few persons have ever been able to clarify it. It makes a profound poetic impression on the hearer, however, and its supernatural pictures are eloquent with a mystic mediæval beauty.

Opinions differ as to the musical merits of Wagner's last work, but it is generally admitted that it is not his masterpiece. The score is, of course, modeled on the Wagner method, and the music consists of a series of "leading motives" so combined as to provide a continuous musical accompaniment to the solemn and impressive if disconnected episodic scenes. The voices sing in the familiar "endless melody" of the later Wagner operas. The first and third

acts are deeply solemn in their religious aspect, and the music is beautiful and significant in spite of this character. In the second act, the flower maidens sing in melodious and alluring dance rhythms. To persons who have never heard "Parsifal," the music will be a new revelation of Wagner's genius as composer and poet, even though the opera be not his master-work.—From "'Parsifal' in New York," by Lawrence Reamer, in the "American Monthly Review of Reviews" for December.

CONCERNING PROCTOR'S.

The theatrical manager who can please the children is the one who unfailingly wins success. These are the jolly days (as well as the holidays) when the little folks are especially eager to be amused by visits to the theatres, and in the Proctor theatres above all others are they catered to intelligently and effectively. Ever since the holidays came near, Mr. Proctor has modeled his programmes with a keen eye to the delighting of his school-children patrons, whom he numbers in the thousands. On any of his bills these days they are sure to be amused by clever trained dogs, grotesque and solemn-faced monkeys, cutely educated cats, or beautiful trained horses; while the marionette shows, the funny moving pictures with their thrilling portrayal of Santa Claus' midnight chimney visit—all contribute to send the little ones home simply delighted.

The wizard Edison, it is said, invented the Kalatechnoscope, or moving picture machine, during one of his idle days, when his brain had become tired with some of the vast problems that confronted him. If this be true, then all the children in the world owe a debt of pleasurable gratitude to that marvelous man of Menlo Park, for of all the features ever placed upon a theatre stage the Kalatechnoscope heads the list in its perpetual fascination for the young folks.

A recently unique but rapidly growing fad in suburban towns, where good entertainment is sought all the time, is the formation of "Proctor Clubs," composed largely of ladies and children who long ago acquired the "Proctor habit" during their shopping visits to New York. These clubs consist generally of congenial little groups of friends and neighbors, from ten to fifty in number, who select certain afternoons or evenings for "Proctor Theatre Parties," which they attend in a body. A block of seats are reserved for them in advance, and there is always some special feature in-

troduced in the bill for their benefit. Already this season nearly forty of these clubs have been in successful operation.

PUBLICATIONS RECEIVED.

Further Investigations Among Fruitarians, by M. E. Joffa, U. S. California Agricultural Experiment Station. Bulletin No. 132, U. S. Department of Agriculture, Washington, D. C.

Open Air Treatment of Tuberculosis: Tent Life in Arizona. R. W. Craig, M.D., Phoenix, Ariz.

An Improvement in Radiography: A print made by direct exposure and development in half a minute without a dark room. Sinclair Tousy, A.M., M.D., New York.

Complete Removal of the Left Vocal Cord for Malignant Disease. Walter F. Chappell, M.D., M.R.C.S., New York.

My Present Position on Appendicitis Question. Robert T. Morris, M.D., New York.

Diagnosis and Treatment of Hereditary Syphilis. E. Harrison Griffin, M.D., New York.

German Meat Regulations, with Original Text. Bulletin No. 50, Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C.

Malignant Tumors of the Pharynx. Francis J. Quinlan, M.D., New York.

Spotted Fever (Tick Fever) of the Rocky Mountains. A New Disease. John F. Anderson, Hygienic Laboratory. Bulletin No. 14. U. S. Public Health and Marine Hospital Service, Washington, D. C.

Treatment of Cancer by the X-Ray, with Remarks on the Use of Radium. William James Morton, M.D., New York.

Some Cases Treated by the X-Ray. *Ibid.* Medicina Preventiva y la Tuberculosis. Dr. Erastus Wilson, Habana, Cuba.

Radaerotherapy: Liquid Air and the X-Ray in Medicine and Surgery. A. Campbell White, M.D., New York.

Four Months' Experience with Anti-Streptococcic Serum in Pulmonary Tuberculosis. S. G. Bonney, A.M., M.D., Denver, Col.

Mechanical Vibration as a Physical Agent in the Treatment of Disease. Frederic H. Morse, M.D., Melrose, Mass.

Was It Wise for the American Medical Association to Change Its Code of Ethics? D. W. Cathell, M.D., Baltimore, Md.

THE SANITARIAN.

FEBRUARY, 1904.

NUMBER 411.

EDUCATION AND THE WORLD'S WORK OF TO-DAY.*

By Prof. R. S. WOODWARD.

It is a time-honored custom in connection with the commencement exercises of our American colleges to read an address, for the benefit especially of those who are about to pass from the limited duties and responsibilities of studentship to the wider duties and responsibilities of citizenship. An opportunity is thus afforded for some last words of friendly counsel, and for a review of those ancient academic ideals which, while they have animated generation after generation of our predecessors, have survived them all, and are still a source of inspiration to our contemporaries. But appropriate as this sort of baccalaureate address may have been in the past, it now appears to be somewhat too scholastic for the happy day which marks the end of a college course of study and the joyful entrance of the graduates into the activities of professional and business life. Moreover, a just appreciation of good advice and a generous susceptibility to lofty ideals require a degree of physical comfort and degree of mental repose rarely attainable in the heat of our average summer day. The solemn lessons of antiquity are losing their force, also, by reason of iteration and reiteration from the commencement platform; so that one may no longer expect to strike a responsive chord, even in classical colleges, by an appeal to the ideas and the ideals of our distinguished ancestors.

It has seemed to me best, therefore, to depart from the beaten track, and to invite your attention to a subject which lies closer at hand; and as the merchant acts wisely in taking stock at the end of his fiscal year, so I trust we, teachers and students alike, may utilize advantageously the end of this academic year to in-

*Commencement address read at Rose Polytechnic Institute, June 11, 1903.

quire what education is and to what extent it meets the demands of our times.

We all know, of course, in a general way, what education means; but most of us would hesitate, I think, if called upon to give a concise definition of the word. Indeed, those of us engaged in the profession of teaching might be held to be ill-qualified to explain the import of the word. We are so near to the business and so much occupied with its details that we may fail to see it in its true proportions, and hence fail to estimate aright its effects and tendencies. On the other hand, those unacquainted with the elaborate machinery of educational affairs are plainly disqualified, for they lack the precise and intimate knowledge essential to define so comprehensive a term. If we appeal, American fashion, to the majority, it will be found that the concensus of public opinion regards education as a series of routine performances, carried on by means of more or less elaborate methods, involving tasks which students sometimes undertake with joy and sometimes with sorrow, and ending for those who complete the programme with a ceremony called graduation. At any rate, this is what we usually mean by elementary education, and we all believe that its administration is desirable, if not essential, to the average boy or girl. And yet I think it would be found troublesome to explain just what is accomplished by this process and why a person subjected to it may be called educated and why one not so fortunate may be called uneducated. Of course, the easy explanation is at hand. We justify the process by its results. These are found to be on the whole elevating to the majority, and so we drift on with the current of public opinion, forgetting, commonly, that while this democratic leveling of intelligence has certain obvious advantages, it has also certain, though perhaps less obvious, disadvantages. And if we inquire what factors should enter into a scheme of elementary education, we at once meet with a confusing diversity of opinion and with the bewildering fact that the schemes already elaborated are so crowded with subjects that there is little chance of adding anything new, and so tenaciously maintained that there is little chance of omitting anything old.

But if we encounter difficulty in defining precisely the meaning and scope of elementary education there would appear to be still greater difficulty in formulating clear ideas as to the meaning and scope of higher education; for with respect to the latter we have to deal with a diversity of opinions which are to a large extent *crystallized*. Ask the average college-bred man what is the best

line of work to pursue in a college course, and he is pretty sure to answer, if he replies spontaneously, that the line he himself pursued is probably the best, or, perhaps, unquestionably the best. Since the average collegian belongs to the traditional school, the average opinion is as unanimous as it is unilateral; and he who expresses it may justly fortify his view by pointing to the excellent results which have come from the pursuit of the time-honored literary curriculum, or, as he would prefer to put it, from the pursuit of the "classics and the humanities." Quite recently, however, in the historical sense, there has arisen a new form of learning, under the name of science, which has now come to be generally recognized as worthy, at least, of a good share of our attention, if it is not comparable in value with the ancient learning; while some of the bolder advocates of science would give it first place in any scheme of education. This new learning, in the comprehensive sense now implied by the word science, is only about thirty years old. But to understand fully its meaning and to appreciate how profoundly it has affected educational matters, one needs to have lived in the prescientific as well as in the present epoch. Suffice it to say here that the advent of science in education was not accomplished without a struggle, which rose at times to a fierceness not altogether creditable to the combatants involved. But though the storm and stress of that struggle, happily, have died away, there remain some controverted questions whose adjustment must be left, perhaps, to you of the present generation to bring about; for we of the prescientific epoch can not discuss them without arousing prejudice which is attributed either to irrational conservatism, on the one hand, or to sweeping iconoclasm, on the other.

I may allude, in passing, to certain forms of this prejudice, and suggest that our sense of humor should help much to dissipate the intellectual fogs which obscure these matters of controversy, and hence lead to solutions which will rest on foundations of merit alone. Thus, even at the present day, many of the older school of education hold, tacitly, if not openly, that studies may be divided into sharply defined categories designated as "liberal," "humanistic," "scientific," "professional," "technical," etc.; and men and women are said to have had "a liberal training," "a professional training," or "a technical training," as the case may be. They say, by implication at least, that mathematics, when pursued a little way, just far enough to make a student entertain the egotistic but erroneous notion *that he knows* something of the subject, is an

29974 1

element of liberal training. On the other hand, if the student goes further, and acquires a working knowledge of mathematics, his training is called professional or technical. Similarly, studies which include the memorabilia of Xenophon and Cæsar, the poetry of Homer and Virgil and Dante and Shakespeare, or, in short, the so-called polite literature, of ancient and modern times, are said to lead to breadth and culture; while studies which include the works of Archimedes, Hipparchus, Galileo, Huygens, Newton, Laplace and Darwin are said to lead to narrowness and specialism; as if the first class of authors were somehow possessed of humanistic traits, and the other class of demoniacal tendencies. So far, indeed, are these distinctions carried that higher moral qualities are not uncommonly attributed to the young man who studies Latin and Greek in order that he may earn a living by teaching them than are attributed to the young man who studies engineering in order that he may earn a living by building bridges which will not fall down and kill folks.

But, you may ask, is it not possible, in spite of tradition, prejudice and conflict of opinion, to lay down some practical precept or working hypothesis that will enable us to proceed along different routes toward the common goal with reasonable hopes of success? Experience during the past thirty years has given, I think, an affirmative answer to this question. We need only to enlarge our definition of education in order to include all that is good in the new learning and to retain all that is good in the old learning. The only imperative restrictions are that we must not prescribe the same curriculum for all students, and that we must not entertain invidious distinctions with respect to any of the curricula. According to this view, then, the formal education of schools and colleges does not consist, as many well-educated people seem to think, in the pursuit of certain studies, but rather in the pursuit of some studies thoroughly well. Herein, it seems to me, is the theoretical as well as the practical solution of the whole matter of the conflict of studies. Provisionally, we have pretty generally reached this conclusion in America. It only remains to replace the narrowness which is willing to accept the traditional limits of learning by a breadth which would hesitate to set any such limits.

If we accept this enlargement of our intellectual horizon, and there seems to be no doubt that we shall soon do so, it will be easy to brush away the distinctions which have long clouded our minds, and still affect our judgments, in the classification of studies. The *adjectives liberal*, technical, humanistic and professional, as com-

monly used to denote differences or to mark invidious distinctions, will be found to be, usually, misleading or meaningless. All studies conscientiously and laboriously pursued will be seen to be liberalizing and humanizing, whether they be pursued with or without a technical or professional end in view. That it is any more creditable to study the works of Dante and Shakespeare than it is to study the works of Galileo and Darwin will be found to be a frail figment of the imagination, growing out of the supposed holiness of metaphysics and the supposed unholiness of physics.

In the educational transformation that has come about in the last three decades, our schools of science and technology have played an important rôle. It goes without saying that they have demonstrated their right to existence, that they have come to stay, and that they should play a still more important educational rôle in the future. They have won their way to prominence in spite of all opposition; and I think it may be justly said that in thoroughness of work and in the development of the spirit of energy and independence essential to the successful and useful citizen they have already surpassed the older classical colleges. But the strength of their position is measured not so much by academic standards as by the achievements of their graduates. The world no longer asks where and how men have been trained; it goes straight to the point and inquires what they can do. This is the supreme test. That the graduates of our technical schools have met this test successfully is proved by their efficiency in nearly every walk of life. The prominence of their work is especially noteworthy in the great industrial progress of our times. The civil, the chemical, the electrical, the mining, the metallurgical, the naval and the sanitary engineer have established a claim to recognition among the learned professions. Astronomers, botanists, chemists, geologists, geodetists, physicians, zoologists and other so-called specialists have also demonstrated by actual achievements that a scientific training fits men well for the work of the world.

In the meantime great changes have likewise taken place in the curricula and in the attitude toward science of our classical colleges. Most of them have given place in their required or elective studies for the principal sciences. Many of them have limited the requirements in the classical languages to a minimum; while a few of our leading institutions have gone so far as to give the degree of A.B. without any requirement in Latin or Greek. It is a significant fact, also, that the scientific method and the scientific

spirit of investigation have worked striking changes in attitude toward their own specialties among the devotees to ancient learning. Thus they speak of the science of history and the science of theology, and even of laboratory methods in these sciences; and among themselves, teachers of the classics are not infrequently referred to as scientific or archaic, according as they are animated by modern or mediæval ideas. A few eminent educators deplore these tendencies and write regretfully of the vanishing monastic features of college life. A few rail bitterly against what they call "the materialism of science," and charge that the perfume of the Attic violet is being stifled by the mephitic odors of the laboratory. Others assert that, while science may be good enough for engineers who build railroads and dig canals, the classics and the humanities are alone fit for the scholar and the gentleman. But the trend of progress is clearly visible in these as well as in other signs of our times. Mediæval methods, customs and ideals are slowly yielding to the reason of modern thought.

Once free from the bias and the restrictions of inherited opinions, education must appeal to us with a broader and a deeper significance. In the best sense of the word, education is a process which should begin in infancy and end only in advanced age. Science has demonstrated that man is a part of, and not apart from, the universe in which we live; and education in the comprehensive meaning of the word is the process of development which fits us to play well our parts in the infinite variety of phenomena which mold us and which we in turn help to mold. Hence the question of education is a many-sided and a far-reaching one, to the larger aspects of which we even who are engaged with some of its formal details can only point the way. Schools and colleges serve only to give the student a start, whence he enters the "University of the Universe," from which there are no graduates. Each may choose his own field, and if he would be a master in it he must become a specialist. Of course there are those who decry the present as an age of specialists and speak and write ruefully of former times when the more learned minds were able to compass the entire domain of accepted learning. But those were times when accepted learning was mostly of the kind called "polite," times when the rapidly rising sciences and their devotees were referred to with anything but terms of politeness. The change from this not very remote past is irrevocable, however, and it is plainly our duty to make the best of the new conditions, full as they are *of novelties and* perplexities. The recent great increase in the

quantity of indispensable knowledge forces us to a hitherto unheard of division of labor in the educational field. The specialist is, therefore, a necessity, though there never was a time when the qualifications of a specialist were so numerous and so exacting. In fact, it may be truly said that one's training now must be broadly liberal in order that it may be minutely special.

The age in which we live is pre-eminently the age of educational opportunities. The school, the college, the university, the library and the museum were never so numerous, so free and so efficient as at the present time. Hundreds of experts, in the study and in the laboratory, in the office and in the field, are contributing by their researches to the world's stock of knowledge. Hundreds of literary, historical, scientific and other technical societies are annually swelling the published volume of the world's best learning; while, in a popular way, the newspaper, the journal and the magazine bring daily, weekly and monthly instalments of this best learning to him who can read it aright. Intercommunication by post and by telegraph, and quick transportation over land and sea are rapidly dissipating class prejudices and supplanting them by friendly rivalries in the common educational advance. The illusions which some eastern institutions have long held with respect to their superiority over institutions in other localities, are rapidly vanishing before the tests of merit and achievement. Indeed, if one may judge from the picked men who pursue work for the higher degrees in our graduate schools, it would appear that the centre of education, like the centre of population, is no longer east of the Appalachian Mountains.

So far then as opportunities go, the college student of to-day has great advantages over his predecessor of thirty or forty years ago. Verily, no one need thirst in vain for knowledge, for the fountains thereof are to be found flowing on every hand. But, to paraphrase an old saying, while we may point out the fountains of learning we may not be certain that men will drink deeply or effectively therefrom. It seems proper, therefore, to inquire to what extent these available advantages are appreciated and utilized by the average student of to-day.

It would be quite unreasonable, of course, to suppose that the student of the present day is very different from or much abler than the student of a generation or two ago. The capacity of the human mind, like astronomical phenomena, is subject mainly to secular variations. There is no doubt, however, that the great increase in knowledge and the enlarged means for its diffusion, in

recent times, have led to a perceptible quickening as well as to a perceptible broadening of the intellectual faculties of men. What may be called the experience of life, and this is, in general, the most important part of education, is begun earlier and is realized in larger measure than ever before. Coming thus to the college or university better acquainted with men and things and pursuing a broader and a more laborious course of study, the graduate of to-day is, as a rule, a better equipped and a more efficient man for the work of the world than any of his forerunners. More is expected of him, more is required of him, and more is accomplished by him than in any preceding age.

But while this is the character we may justly attribute to the majority of our college men, there is a noisy minority of them who have succeeded, apparently, in convincing the public, and to a large extent college authorities, that one of the principal functions of an educational institution is the cultivation of muscle and the conduct of athletic sports. Along with the growth of this minority there has sprung up, also, a class of less strenuous men, who, taking advantage of the elective system, are pursuing courses of aimless discontinuity involving a minimum of work and a maximum of play. They toil not, except to avoid hard labor; neither do they spin, except yarns of small talk over their pipes and their bowls. I need not explain to you that these types of men are well known in natural history. From time immemorial the gladiator and the Miss Nancy have received much of that fleeting attention which the careless crowd bestows on the gaudily attired tumblers of the circus and on the transparent masks of pretenders. It is not so well known, however, that these types of men—prospective bachelors of athletics and degree-hunting dudes—are now wielding an influence distinctly inimical to academic ideals and distinctly debasing to academic morals.

Pray do not misunderstand me. I am not opposed to physical culture and athletic sports. Scarcely any element of education is so important as the attainment of a healthy balance between the intellectual and the physical functions of men. The ancient maxim of a sound mind in a sound body is more fitting now than ever before. We know or ought to know much better than our ancestors to what extent clear thought and right action depend on good lungs, sound hearts and unclogged livers. My protest is not against school and college athletics as such, but against athletics as they are now generally carried on, and especially against inter-*collegiate* contests. As now practised, athletics seem to me to

defeat the object they are intended to attain. They cultivate almost exclusively the men who are usually more in need of intellectual training, and they ignore almost completely the men who are physically defective. The latter are only permitted to stand by and whoop for their alma mater and for her gladiators. Strangely enough, too, the advisers and trainers of our teams and crews are not always men to whom good judgment would commit the training of youth, but they are often men as ignorant of physical culture as they are of mental and moral culture; their names, indeed, are commonly better known to the patrons of the turf and the ring than they are to the patrons of the cap and the gown.

The usually keen American sense of humor seems to have failed us in these matters. Thus the reporters appear to think it essential to state that every distinguished college graduate who dies was a noted athlete in his day, and they often ascribe great prowess to men of a notably opposite physique. One might infer also, from the prominence given to the small number of "punters" and "half-backs" of the day, that they are the only college men who are likely to succeed in life. The sporting populace and the sporting alumni go wild with enthusiasm over intercollegiate contests, while the press, in a fashion similar to that followed in describing prize fights, devotes much more space to these ephemeral events than it does to all other educational affairs combined. It is no wonder then that the light-headed undergraduate attires himself like a stable-boy and affects the manners and vices of a cowboy without aspiring to the virtues of either. He may be excused also for entertaining the hypothesis that colleges are athletic clubs, and that his professors, as suggested by Mr. Dooley, will proceed leisurely to take from him the requisite minimum of formalities leading to a degree.

There is a darker side of this question which calls for something more than a quickened sense of humor. It is the vast expense entailed by these extra-academic operations. Fifty to a hundred thousand dollars per annum are certainly not needed by a college or a university to provide adequate physical training for a few athletes and amusement for a few hundreds of men who cannot find health and pleasure in more useful occupations. In so far as educational institutions tacitly encourage the practice of this sort of political economy by students, the majority of whom have yet to try their hands at self-support, they must be held guilty of promoting a degree of extravagance which in other walks of life is usually *associated with open corruption*.

But the fashions, the follies and the fads of college men, like those of any other limited community, play an insignificant rôle in the larger drama of life. However important to his little circle a student may have been as an undergraduate, he is likely to meet with a chilly reception unless he is well qualified for arduous service in the work of the world. Those who have thus qualified, however, may go forth with confidence; for as ours is pre-eminently the age of educational opportunity, so is it pre-eminently the age of professional and business opportunity. There never was a time when talent, energy and enterprise in young men were so much in demand as at present. Men who can plan and execute; men who can work out knotty problems in engineering, in transportation, in sanitation and in finance; and men who can study aright the mighty questions of industrial and social economy now confronting us, are everywhere needed. Above all, there is a demand for men who can see straight, and who can live lives free from moral obliquity; men who can expose the frauds of politicians and the tricks of boodlers and grafters; and men who can demonstrate, by example as well as by precept, that the homely virtues of honesty, industry and sobriety are not dying out in our land.

The world demands men who are not afraid of hard labor; those who would work during a portion, only, of their leisure time, need not apply. The world demands men who are patient and enduring; those who cannot find pleasure in business, but who would make a business of pleasure, are not wanted. The world demands men of courage and convictions; those who vacillate and temporize are sure to be beaten in the race of life.

Young men often wonder why they get on so slowly and why the world puts so low an estimate on their abilities. While the element of chance is not wholly negligible in these matters, and while "influence" and "pull," especially in politics, sometimes interfere with "natural selection," the reason is generally plain in any individual case. The simple fact is that the world sets severely high requirements for the competent and the trustworthy, and in nine cases out of ten the men who are rejected have failed to pass in these requirements.

Along with the great advantages now afforded for education, and along with the inspiring fields of work now open to educated men there should go a correspondingly high sense of duty on the part of our college graduates. They are in no sense aristocrats, and they would become ridiculous in the assumption of any unproved superiority. Nevertheless, if they are too sensitively pos-

sessed of that modesty which is born of a knowledge of things, we may say for them *noblesse oblige* without undue hesitancy. You who go forth to-day, therefore, must assume, if you bear well your responsibilities, new and increasing obligations, obligations to your college, obligations to your country, and obligations to your fellow-men of the world.

Those of you who have caught the spirit of progress which animates modern science have a special duty to perform. Ours is the epoch of unparalleled improvements and advances. In all that makes for the permanent progress of humanity, the contributions of science in the nineteenth century alone are held by competent judges to compare favorably with those from all other sources throughout historic time. You are among the heirs of these contributions, and it rests with you, in part, to determine what use may be made of them. A flood of light is available, but it would appear to illuminate the intelligence of only a small fraction of our race. When we consider to what extent superstition and error prevail at the present day with the most enlightened peoples of the world, it is plain that the scientific habit of mind is none too common. We smile, for example, at the folly of the sailor whose fears may be drowned in a pot of beer and who commits his fate to a rusty horseshoe nailed over the entrance to his forecastle. And yet, our "city fathers" permit epidemics of typhoid fever to prevail with startling frequency and with frightful mortality. Think, too, for a moment of the shocking waste of health and wealth to which the alluring advertisements of quacks and other charlatans bear testimony in the daily and weekly press. Think also of the waste of time and money which comes from the habit of gambling so common in all races from the lowest to the highest. All such vices are deeply rooted in the human family and fortified by our superstitious tendencies to accept without proof anything which promises the marvelous. No mere literary training can help much to overcome this deplorable inheritance. Nothing short of the scientific frame of mind and habits of thought can prevail against such ancestral traits.

There is endless scope, therefore, for additional improvements and advances along the lines your training in science has fitted you to follow. Science bids you look forward, then, with confident optimism. But you should waste no time in idle contemplation of the splendid achievements already attained. The price of progress, like that of liberty, is eternal vigilance. One must be ever active, ever patiently persistent, proving all things and holding fast to that which *is good.*—"*Science,*" *August 7*, 1903.

BRAIN-FAG, AND ITS EFFECTS ON HEALTH.

By JOHN KNOTT, M.A., M.D. (Univ. Dublin); M.R.C.P.I.; M.R.I.A., Dublin.

Sydney Smith usually receives credit for having popularized the aphorism that "a man is always happy till he finds out that he has digestive organs." Functional derangements of the stomach and liver have long been known to exercise a baneful influence on the owner's enjoyment of the good things of life. But it has been reserved for this present epoch of over-civilization and *jeune siecle* refinement of speculation, to discover and deplore the injurious effects which overstrain of the organs of thought and sensation exercises over the other portions of the human frame. Thinking men have, of course, for many ages been conscious of such influence; but it was only in a very vague way. According to the celebrated author of the "Anatomy of Melancholy," Socrates is answerable for the dictum:

> Oculum non curabis sine toto capite,
> Nec caput sine toto corpore,
> Nec totum corpus sine animo.

A fairly accurate knowledge of the structure and functions of the central nervous system has been attained only within a very recent period indeed. It is now well known that the human body, as in the case of other animals, is essentially formed of a series of minute conducting threads, called "nerves," each of which is connected at one end with one of the fundamental cells of which the various tissues are built up; and, at the other, with a nerve cell, which regulates all the functions of the latter. The rest is merely padding and pr[illegible] covering—the "leather or prunello" of the complete organ[illegible]ture. The nutrition of these physiological units is supplied [illegible]n the blood, minute tubular vessels containing which ramify eve[illegible]where among those threads and cells of the body. The blood-v[illegible]ssels are themselves supplied by absorption, from the products [illegible] digestion within the alimentary canal; and the nutrient conten[illegible] pass out, by a process of leakage, to the various tissues in their neighborhood. How the latter select their own

pabulum from the constituents of the blood, and so skilfully repair the waste which continually goes on during the existence of life, is explainable only by the influence of a vital force—a power of organic life, the heart of whose mystery has not yet been plucked out by the scientific physiologist. It is, however, well known that the amount of blood supplied to the tissues, and the peculiar selective power of the latter, by which they regulate their own nutrition, are both directly governed by the central nervous system. Accordingly, when the influence of the latter has been completely cut off from any portion of the living body, nutrition entirely fails, and local death is the result. When the demonstration of this connection has once been satisfactorily understood, it will be seen to follow, as a corollary, that if the nervous system is not in a condition to perform its usual functions, the nutrition—*i. e.*, the health—of the whole body must suffer.

"Mens sana in corpore sano" is an adage old enough to be at least venerable. The idea connoted by the *mens* of the mediæval metaphysician, or *mind* of the average educated person of the opening of the twentieth century, is one which will be found on close examination to be sufficiently vague. What was the nature of the mind, and what was the nature of the soul, what functions they possessed in common, and how far they were to be regarded as separate organs, are questions which have agitated philosophers for untold centuries; and which, undoubtedly led, in their treatment by the Aristotelian schoolmen, to some of the most brilliant displays of speculative subtlety and logical brilliancy that the world has hitherto seen. The philosophers of ancient Greece, nearly every one of whom entertained the most elevated ideas of the functions of the human intellect and displayed the keenest hankering for the immortality of thought and of the mysterious organ of its production, showed a painfully amusing degree of ingenuity in their endeavors to locate the seat of the spiritual portion of man. Plato and Democritus placed it in the head, throughout; Strato, between the eyebrows; Erasistratus, in the investing membrane of the brain; Herophilus, in the ventricular spaces in the interior of the brain; Parmenides and Epicurus, a[illegible] the breast; the Stoics, either in the heart or in the spirit[illegible] the heart; Diogenes, in the curved portion of the aorta, [illegible], according to him, was filled during life with the vital spirit; [illegible]docles considered that it was distributed throughout the mass[illegible] blood; and Pythagoras divided the soul into two parts—of which he placed the *vital* portion in the heart, and the *intellectual* in the head. When

the doctrines of the Christian faith were adopted by the nations of Europe, a period of truce was set to these "vain speculations." For many centuries little or nothing was added to the physical knowledge of the human body, and the teachings of Aristotle were accepted as final in the metaphysical domain. With the revival of learning, the restlessness of human inquiry again manifested itself; and as the knowledge of the intimate structure of the human frame slowly (and I may say, painfully) increased, new guesses began to be made concerning the habitat of the soul. With the very gradual growth of the physiological investigation of the nervous system the tendency to locate the soul somewhere within the brain became more defined; and a curious degree of ingenuity—half physical, half metaphysical—was displayed by various authorities in discussing the probabilities of the favored situation. Most would place it in the median plane—in an azygos, or non-symmetrical, organ. For instance, Descartes placed the soul in the *pineal gland,* Bonnet in the *corpus callosum,* Digby in the *sæptum lucidum,* Platner in the *corpora quadrigemina,* Haller in the *pons Varolii,* and Boerhaave in the *medulla oblongata.* It is rather hard to realize the serious defence of such speculations by men of gigantic intellect. Yet such is the history of human thought! The increasing use of the microscope and of the telescope, the free exchange and more rapid transmission of ideas which have developed to such a previously unthought of extent in the second half of the nineteenth century, have had the undoubted effect of checking the future developments of such discussions—at least among scientific men.

To the distinguished physiologist and physician, Gall, certainly belongs the merit of having first strongly advocated the localization of the organs of thought in the superficial part of the brain. The name of this man is very generally mentioned in the present day with a certain amount of derision—as he is almost solely known to the general public as the founder of phrenology. Yet, "faddist" as he undoubtedly was, it is hardly any exaggeration to say that Gall did more to advance our knowledge of the structure and functions of the human brain than did all the scientists of his own age, and of all preceding ages. Even the exaggerations into which his great hobby of localization led him had the effect of stimulating the observations of his contemporaries—if only for purposes of contradiction. No scientific facts are now better established than our knowledge that all the intellectual operations of the human mind are performed in the cells of the cortical layer of the

brain; and that the functional activity of these, as well as of all other cells of the body, is accompanied by, and dependent upon, increased molecular movement. But what the mysterious force is which guides and regulates these molecular movements we know no more definitely than did Pythagoras or Democritus. The partition which separates the *known* from the *unknown* (and *unknowable*) is very thin indeed; so thin that we almost seem to be able to *feel* through it. But we cannot *see* through it: it remains as opaque as ever! Let us then reverently bow before the unseen Architect of our being; and, while we recollect that absolute and final knowledge on any subject has not hitherto been attained by man, let us try to utilize with profit what attainments we possess.

The superficial layer of the brain—the marrow-like mass which fills the interior of the skull—is densely studded with the *nerve cells*, of microscopic size, which collectively form the great imperial parliament that presides over the functions of all parts of the body. Every cell of every tissue of the body is more or less directly connected with these governing cells, by means of the telegraphic filaments which are known as nerves. As already mentioned, the nerve cells and nerve filaments (which are themselves formed of elongated cells) are dependent for their nutrition on the supply of blood, and this latter is in its turn regulated by the influence of the nerve centres. Hence it is that any derangement of the latter can never be limited in its results to its own area—it always transmits the ill-effects to distant parts.

Near the under surface of the brain, and in the slender continuation of its substance which passes down along the backbone, are placed the subsidiary centres which deal, in the first instance, with the lower animal functions of motion, nutrition, etc. These, like all the others, are held in check by the higher centres above referred to.

We are now in a position to appreciate the evil effects which must result to the whole system from over-work of the brain. As the brain is now, so far as I know, always spoken of as the organ of thought, it is almost superfluous to add that by overwork of the brain I mean overwork of the intellectual faculties. In this age of over-civilization and over-refinement, of ceaseless hurry and worry, of ever-recurring examinations for young people, and of never-ceasing competition among their elders, when so large a proportion of the population is to be found crowded together in large cities, and when education is distributed by external pressure to the least fortunate members of the community, the organs of human

thought are subjected to an amount of wear and tear which could not have continuously affected so many members of the human family at any previous date in the history of the world. Let us examine more closely the conditions and the consequences of such overwork. The brain, like all other organs of the body, receives during health a supply of blood fairly proportional to its activity at any given moment. The blood vessels here, as elsewhere, are provided with muscular and elastic coats; and their calibre is, accordingly, under the control of the nervous system. Where the nerve centres themselves become exhausted by overwork, they necessarily lose this control more or less completely, according to the degree of previous strain. In the state of health, a resting organ of the body will be found to have its blood vessels contracted, and the part will receive but enough pabulum for a vegetative existence. Where the same organ is passing into a state of activity, its blood vessels will be found to dilate instantaneously, and a greater proportion of the nutritive fluid is allowed to pass through, to supply the necessary loss by wear and tear. These changes in the circulation occur in the brain as elsewhere; but here they are even more notable, as the blood vessels of the brain are thin-walled and yielding, beyond those of other organs. Also, as occurs in other organs, this increase of circulation, which accompanies functional activity, always promotes the healthy nutrition of the organ—up to a certain limit. Where this process of overstrain has been too prolonged, the coats of the blood vessels of the part partially lose their elasticity and are slow to recover their ordinary healthy contractility. When the stage of exertion has been too much or too often repeated, the walls of the vessels tend to approach a condition comparable to that of over-stretched india rubber, the minute blood vessels remain permanently dilated, a greater quantity of blood is found in them, but circulating more sluggishly; the exchange between the blood and tissues takes place more slowly, the circulation is less pure, the part is in a state of chronic congestion. As the nose of the tippler develops a tell-tale blush during the period of festivity, which, in the earlier years of enjoyment, afterward disappears—quickly at first, by and by more slowly—so is it with the brain of the over-read or over-worried man. In either case, the blush, after some time, tends to become permanent; and, in many cases, curious excrescences may form.

When such a state of circulation has become established in the brain, its functions are necessarily seriously impaired. The individual affected fails to preserve the same clearness of thought, the

same degree of mental energy, of readiness of resolve, of quickness of resource, and of capability of continuous and determined action, for which he may have been formerly distinguished, and which had been so important to him in the daily business of life. This intellectual deterioration may be a source of ruin to a man whose success in business depends solely on his own activity.

But, in addition to this failure of the mental powers, there is, as will be easily perceived, I think, by the reader who has noted what has been already said, a marked deterioration of the general health. The well-known physiological fact that mental work tends to check the secretion of the gastric juice, tells rapidly on the digestive functions of those anxious and worried individuals who cannot, or will not, allow themselves a fair amount of rest after meals. This habit, when continued, tends, with the restlessness and sleeplessness which torture the unhappy owner of an overworked brain, to reduce him to the state of a morose dyspeptic, whose life is a burden to himself and whose presence is unpleasant to others; and who has little to look forward to in life but the dreary accompaniments of a premature old age. Such are the evils which, with the innumerable smaller collateral ones, are brought on by the refusal to the organ of thought of its due share of rest. Such symptoms are commoner now than in former ages of the world; most frequently observed in the land of rapid progress—America; and induced oftener than in any other way by the too devoted worship of the almost universally presiding deity of this materialistic age—the Almighty Dollar.—From "New York Medical Journal," Nov. 21, 1903.

IMPORTANCE OF FOOD INSPECTION AS A SANITARY MEASURE; AND A REMINISCENCE OF YELLOW FEVER.

By J. C. LeHardy, M.D.

Of all the measures for the protection of public health, none are more conducive to the physical and moral well-being of the inhabitants of cities than those calculated to prevent the sale of unwholesome foods, adulterated drinks and worthless medicines. To impure milk and the eating of spoiled meats and fish, of stale vegetables, and of fermenting or decaying fruits, may be attributed most of the summer complaints common to infants and children

and much among adults. Police records show that most of the unpremeditated brutal murders are committed by persons under the influence of alcoholic drinks, and from general statistics we gather that a very large per cent. of all the heinous crimes is attributed to the effects of vile liquors. Moreover, physicians of large experience assert that the want of success in the treatment, and, at times, even fatal results in cases of sickness, is due to the inertness, substitution, or adulteration of the medicines dispensed.

To the drinking of infected milk or polluted water epidemics of Asiatic cholera, typhoid fever and other dangerous diseases have been often traced. So marked have been the good effects of preventive measures against these dangers wherever they have been instituted, that progressive cities throughout the civilized world are now enforcing them; and many of the large centres of population have built extensive laboratories, where chemists and bacteriologists are employed testing and analyzing specimens of food and samples of water brought by citizens, physicians, or by inspecting officers. And others are occupied in preparing vaccins and antitoxins against or to antagonize dangerous diseases more or less due to such impurities.

These measures, however, involve too great an expenditure of money for them to be available to small cities and towns. Nevertheless, there are now in almost all parts of this country manufacturing chemists and biologists who possess facilities for making the most intricate analyses, accessible in emergencies, and prepared to furnish vaccins and antitoxins for the protection of the public health.

The need of this kind of protection being as urgent in the small as in the large centres of population, it becomes the duty of all civic authorities to provide food inspection, as well as other safeguards, to the people they have sworn to protect. It is well known that places not so protected become dumping-grounds where producers, jobbers and speculators get rid of articles they cannot sell in the open market. Dealers eagerly buy this class of goods, because the profits are enormous.

The most effective way of stopping the sale of any article of merchandise is to make such sale unprofitable to the dealer. To accomplish this, ordinances should be passed making it a misdemeanor for any person to keep, sell, or offer for sale, unwholesome food or food products; adulterated, drugged or made-up wines, liquors, spirits, beers and vinegars; any watered, mixed milk, or milk known to have been exposed to contaminating conditions;

inert, diluted or adulterated medicines; and ordinances to appoint officers to inspect places where these articles are kept for sale, to take sample for inspection or analysis, and with power to condemn, confiscate or destroy any article found to be dangerous to health or life; to indict and prosecute all persons violating any of the food ordinances.

Almost every village of any push nowadays has a health officer, who is expected to remove the causes of disease and promote works calculated to improve health and lengthen the lives of those he serves. But most generally the duties of that officer are restricted to hunting cases of smallpox and other contagious diseases, fumigation of premises, destruction of bedding, clothing, etc., and to compiling of mortality statistics. He has no power to act whatever; is poorly paid, and liable to be ousted with every change of administration. Under such conditions, how can sanitary laws be properly enforced? Here the health officer is a mere puppet in the hands of a board, sometimes called board of health, selected, not because of his knowledge of sanitation, but as a reward for political services, etc. The instinct of self-preservation, coupled with common sense, would, it seems, urge the people to insist on having an office, so important to the welfare of the entire community, filled by one whose moral integrity and firmness have been fully tested, one who has had some experience, and possesses an aptitude for that class of work. This office should be made permanent, and the occupant required to give the whole of his time to the duties of the office. He should give sufficient bonds to protect the corporation against losses due to neglect or otherwise; the salary paid him should be sufficient to make him independent, and enable him to execute his work without fear or favor.

ORDINANCE DEFINING THE DUTIES OF FOOD INSPECTOR AND ASSISTANTS.

In addition to the other duties of a health officer, he should also superintend the work attendant upon food inspection. He should be required to enforce all the health laws and ordinances, select his subordinates, and assume the responsibility for their behavior and their work.

The health officer and his sworn inspectors shall have the power and are required to enter and examine every place, within the corporate limits, where food or food products of any kind are kept for sale; to condemn or confiscate any article of food which they consider to be unwholesome; if ill-smelling or dangerous to public

health they shall have it carted away at once and destroyed or buried. They shall carefully examine animals intended to be used for food, whether in transit, in stables or yards; if they are diseased they shall condemn them and send them off for treatment; if incurable they shall be killed and burned or buried at a safe distance outside of the corporate limits. It will be the duty of these officers to enter every grocery store, every market, green groceries and places where fish, meats, vegetables or fruit are kept for sale, every fruit and candy store, every restaurant or places where food is prepared or cooked, all the bakeries, cake shops, bar-rooms and places where wine, liquors, spirits, beer, vinegar or other articles used for drinks are made, kept or sold; all dairies, milk wagons and places where milk and milk products are kept or sold; all drug-stores and places where medicines are mixed, manufactured or sold; to take samples of any or every article found therein, giving his receipt therefor. The health officer shall carefully examine every sample brought to him by any citizen or inspector. If there exist any evidence of fraud or adulteration he shall at once test or analyze said sample, or cause it to be analyzed, by some competent and reliable chemist selected for the purpose by the authorities. From him he shall secure a certified copy of the analysis of each sample. When this analysis shows that the article has been fraudulently tampered with or adulterated, it shall be his imperative duty to at once confiscate said article, to indict and prosecute the person who furnished the sample; to bring said article with the analysis, and give his own and his inspector's evidence before the court, that all guilty parties may be dealt with in accordance with the provisions of the ordinances.

ORDINANCE DEFINING OFFENSES WHICH SHALL BE PUNISHED BY FINES AND IMPRISONMENT.

Any person keeping, selling, or offering for sale, any article of food or any product used for food, which is unwholesome, has been fraudulently tampered with, or adulterated, any liquid used for drinks that has been adulterated or substituted; any medicine that is inert, that has been substituted or adulterated; any milk known to be infected with the germs of disease or has been tampered with; any animal intended for food, if unsound or diseased, shall surrender any such article to the health officer or his deputies on demand. He shall be indicted and tried in a court having jurisdiction; if found guilty, he shall be fined one hundred dollars *for the first offense* and held in prison until this fine is paid. Should

the same person be convicted a second time, the fine shall be five hundred dollars, six months' imprisonment, and his or her license revoked.

In case any reputable citizen or official enters a complaint against the health officer or any of his inspectors, such complaint shall be fully and publicly investigated by the mayor and administrative board; if this officer or inspector is found guilty of fraud, of malfeasance or neglect, it will be the board's bounden duty to prosecute said officer, who shall, if convicted of neglect, pay a fine of one hundred dollars for the first offence; but when found guilty a second time, or the offence is malfeasance, the fine shall be five hundred dollars, with imprisonment until said fine is paid, and he shall be permanently dismissed from office.

There are ordinances upon the books of almost every corporate town and village against the sale of unwholesome food and adulterated drinks, but they are not enforced. Unscrupulous dealers taking advantage of the situation, sell to the unsuspecting or benign inhabitants second-hand and worthless goods: meat so spoiled that it is fit for a carrion only, wilted and fermenting vegetables, soft or partly decayed fruit, stale or mixed milk, when they should have been protected by those in authority. But when these people shall once understand that the health officer is responsible and can be prosecuted for neglect or malfeasance, it is likely that they will protect themselves, and more likely still that the health officer and his deputies will enforce the ordinances to the letter. In all matters where health and life is concerned, politics, and as far as possible, theory, should be turned out, and common sense and justice invited in!

MOSQUITOES AND YELLOW FEVER.

The mosquito theory, lately foisted in on our people as was the house fly years ago, instead of being a step in the right direction, simply tends to divert the mind from what has already been done to rid this continent of yellow fever, once a very formidable scourge. Such theory cannot change the nature or habits of that disease. It will neither prevent its recurrence nor diminish its fatality. As of yore it will recur in the epidemic form, starting in the hottest part of summer in some of the undrained and filthy localities within the yellow fever zone, and spread wherever the conditions for its propagation are favorable, in spite of the most rigid measures or best laid plans to "jugulate" it or to check its progress: fire, smoke, electricity, the booming of cannons (concussion), segregation, freezing, slaughtering the mosquitoes or house flies,

and what not, have all been tried *ad nauseam* from its first appearance in Boston (1696), repeated at the recurrence of every epidemic, to this very day, at Laredo. These experiments always failed, because yellow fever is a self-limited disease, which spreads for about ninety days, then gradually dies out, freeze or no freeze.

Yellow fever was more frequent and virulent in Boston, Providence, New York, Philadelphia, Baltimore, etc., at one period, than it is now in any of the Southern States. The mosquito, which in the seventeenth and eighteenth centuries thrust its venomous proboscis into the skin of the inhabitants when those cities were subject to yellow fever epidemics, still performs the same office and calls forth the same forcible expressions, but "Yellow Jack" has left them many, many years ago!

The moment sanitation stepped in, and the people of large cities were given more space to breathe in, pure air, the filth removed, the streams purified and the wet lands drained, the ravages of yellow fever and of Asiatic cholera soon were things of the past.

To that great conflagration which destroyed a large portion of London (1665), soon after the loss of a great many of her inhabitants by the plague, the world owes the benefits of sanitary measures. In rebuilding the burned district, the streets were made wider, the yards more spacious, rooms better lighted and aired, sewers built, and the streets and yards kept cleaner. These changes were at once followed by an improvement in the health of the inhabitants and diminution of the death rate. The plague never returned. Cities on the continent, profiting by this example, got rid of the dread ogres one after the other.

After sustaining great losses by successive epidemics of yellow fever, the returns of which strict quarantine regulations had failed to prevent, the inhabitants of Boston decided on cleaning their town, and to transform the marshy lands surrounding them into truck gardens and productive orchards. Starting this good work in 1700, they witnessed the last attempt at an outbreak of the fever (a few cases) in 1805.

Baltimore was one of the first to follow her example and to get rid of yellow fever and of her rigid quarantine in 1818; New York followed, in 1822. Philadelphia, 1853. Norfolk planted strawberries on her drained marshy lands, using the city's filth as fertilizer, thus solving this problem, in 1855.

Charleston, S. C., which had suffered longer, more frequently, and sustained greater losses than any other city upon the South Atlantic coast, finally, after the epidemic of 1868, decided to give

sanitation a trial. A better and more extended sewer system was built. The drainage of the low and marshy lands near the town was pushed as rapidly as possible. While this work was progressing (1871) there occurred an outbreak of the fever, but the disease was mild and a small part of the city only was infected. From that date not a single case of yellow fever originated in that city.

Savannah's and Brunswick's last experience was in 1876; it was a costly one. Fully twelve thousand Savannahians had the fever; of these nearly one thousand died. Brunswick fared almost as badly. Extensive sanitary works in city and county were started soon after; a system of canals and open drains were dug in the vicinity of these towns to carry storm water to the river and to dry the low lands; large brick conduits to remove all storm water from the city, while a separate system of small sewers removed the liquid filth and human ordure from dwellings, etc. This work placed these two cities outside of the realm over which *Yellow Jack* still rules. From what has gone before, it is safe to assert that, as soon as the cities, towns and villages in the so-called yellow fever zone clean and properly drain their locations they will no longer suffer from the "American plague"; but in places where this is not done, where filth accumulates and the soil remains saturated or covered with stagnant water in summer will be just as liable to its visitations on "epidemic years" as they were two hundred summers ago.

Savannah, Ga., offers a graphic illustration of the effects which drainage produced upon the health, the diseases and the mortality of her inhabitants. Between 1800 and 1820 the low lands on both flanks of the town were planted in rice and indigo; these plants grow in water all summer; this water becomes putrid; the lands could not be drained. During this period one person died in every fourteen, 72 per 1,000. The prevailing diseases were (as recorded in the writings of Drs. Jones, Daniell and Waring) malarial, intermittent, bilious, congestive, and autumnal fevers. Pleurisy, rheumatism, dysentery. Malignant eruptive diseases were frequently met with. Black vomit was seen everywhere. In 1820 a severe yellow fever epidemic killed 600 of the 3,000 inhabitants. After this experience the town council prohibited the "wet culture," that is, of plants growing in water. The low lands were ditched, dried and planted in truck and other plants requiring dry culture.

This ditching outside the limits was started in 1821. In town, furrows were made in the streets with a plow, to prevent storm

water from stagnating. Simple and primitive as were these measures, the death rate soon dropped from 7.04 to 3.04 per cent., and with the improved methods in drainage, in the disposal of sewage, and the systematic and thorough removal of the garbage, human ordure, etc., the percentage continued to decrease. Among the whites it is now 1.05 per cent., or 15 per 1,000.

Just as sanitation was the main factor in ridding the civilized world of the plague, cholera, yellow fever, and other fatal diseases which counted their yearly victims by the millions, diminished the mortality, and increased the duration of life; food inspection, by preventing the use of unwholesome foods and drinks, will not only be the means of reducing mortality and increasing the term of life still more, but eating pure and healthy food, more than any other measure affecting the public health, must, by its effect upon the blood, greatly increase the physical powers and elevate the moral standard of the entire human race, the effect of which also will be to diminish the now rapidly increasing ratio of insanity and all sorts of crimes.

Savannah, Ga., December 20, 1903.

THE SANITARY CONDITIONS AND THE DISEASES COMMON TO THE ISTHMUS OF PANAMA.*

By HERBERT O. SHIFFERT, Assistant Surgeon, U. S. Navy.

The sanitary conditions of Colon are very poor. There is no system of sewerage or other means provided by which refuse may be removed from the city limits. All kinds of garbage, slops, old clothes, and excreta are thrown out on the streets and in back yards, and judging from the size of the heaps accumulations for years must certainly exist in the latter places. The streets would be in a like condition but for the fact that vultures or carrion crows act as scavengers and represent the only street cleaning department. These piles of filth, which practically extend up to the back doors of all houses, did not in themselves seem to be a source of danger to the public health, the possible reason being that at the time no contagious disease existed; but should an epidemic of smallpox, for instance, visit Colon, then these heaps, together with the dirty habits of the people, would become at once a source of contagion perfect in all details. From a personal inter-

*From Report of the Surgeon-General U. S. Navy, 1903.

view with the health officer I found that dirt and filth were not the only dangers, for the law does not provide for either inland or maritime quarantine. During the months of January, February and March a rather severe epidemic of smallpox visited Panama, and at no time were precautions taken to prevent its spread. Passengers on the different trains were not inspected, isolation was not compulsory, and even simple house quarantine was not attempted. Relatives and friends visited infected patients, apparently without fear of the disease and certainly without fear of being subjected to any of the modern methods used to prevent its propagation. Men were frequently seen walking along the streets and even riding on the trains with a partially dried smallpox scab visible on their faces. Under the circumstances it seems strange that the disease did not appear in Colon; but the fact remains that up to the date of our departure no cases were officially reported. "Officially" is used, because I am certain that the disease did exist, but the health officer is so handicapped by politics and politicians that he has to wait until the proportions of a widespread epidemic are reached before any notice is taken of his warnings.

Ships entering the port are not boarded by health officers and bills of health issued to departing vessels are of no value, for although diseases may not exist, passengers often come directly from infected districts. With all these unfavorable surroundings and disregard for sanitary laws, there is one redeeming feature, and that is that the water supply is pure. The water is derived from a reservoir supplied by natural springs, and is conducted by means of iron pipes from Monkey Hill, the place of its location, to Colon, a distance of about eight miles. The reservoir and springs are fenced in, the walls and adjacent banks kept clean, and no habitations allowed on either watershed. In consequence of this, diseases due to impure drinking water, such as typhoid fever, dysentery, cholera, etc., are practically unknown. As this is the only water supply, the city bids fair to maintain this distinction. However, just before we sailed from the port an epidemic of dysentery, which was catarrhal in character, appeared, but could not with certainty be traced to the water. The waterworks do not belong to the city, but are the property of the Panama Railroad Company, from whom the city rents a few water stations, where the inhabitants may get a supply on the payment of a few cents.

The Isthmus, by which term I mean the country along the railroad, is in even a worse condition than Colon. The same general disregard for sanitary laws is present, and in addition the water

supply for small towns is impure. Water is obtained from small streams which are always polluted by privies, pig-pens, hencoops, etc. Many times I have seen natives drawing the water to be used for drinking purposes from a stream above which a privy emptied directly. For the first twelve miles along the railroad and proposed canal route the country is low and marshy and affords an admirable breeding place for mosquitoes, which are present in swarms, and among their number are a great many of the genus anopheles. The result is that malaria is endemic, particularly the pernicious type.

The diseases common to Colon and the Isthmus are as follows, and occur with frequency in the order named: Malaria; remittent, intermittent, and pernicious fevers; smallpox, yellow fever, catarrhal dysentery, leprosy, and elephantiasis.

Malaria, as has been said, is endemic, but becomes worse at the change of seasons, *i. e.*, in the months of May and June and November and December. Smallpox occurs frequently, and enough has already been said to show that conditions are favorable for its spread.

During the period this vessel remained in Colon no cases of yellow fever were seen or heard of; but from interviews with local physicians the following facts were obtained. It occurs in epidemics about once every three years, the epidemics varying in intensity. It never originates in Colon, but has been repeatedly traced to Panama and from thence to Guayaquil, the principal port of Ecuador. It is regarded as particularly fatal, and the physicians with whom I conversed stated that they never saw a case recover. The information in regard to this dreaded disease was very unsatisfactory, but I think that there is less yellow fever on the Isthmus and in Colon than is generally supposed. An effort was made to get the hospital records of the old French Canal Company, but they could not be obtained. I visited a hospital in Colon which was formerly used by the old French company when active operations were being prosecuted on the canal. The hospital is now turned over to the Sisters of Charity, and I asked one of them, who was a nurse under the old régime, if they had many yellow fever patients during the old canal days. She replied that they had great numbers and that all died. I was astonished when she informed me that one yellow fever patient was even then in the hospital. The supposed yellow fever patient certainly did not have that disease, but was dying from pernicious malaria. I am sure that if the truth was known a great many of the victims supposed

to have died of yellow fever during active work on the canal really succumbed to pernicious malaria.

Intestinal disorders seemed to be limited to what was known as epidemic diarrhea, probably simple catarrhal dysentery. It sets in with pains in the abdomen, the temperature rises to 100° to 101° F., the patient has from five to ten stools during the day, lasting for about three days. It responds readily to treatment, which consists of liquid diet, rest in bed, and large doses of subnitrate of bismuth.

Leprosy seems to have gained quite a foothold in the country, and the American minister at Bogota informed me that about 30,000 people are lepers and that no effort is made to isolate them. I saw but two cases on the Isthmus; both walked about undisturbed, and lived where they chose.

There are two hospitals in Colon; one referred to above as the old French hospital, is dilapidated and entirely unfit for use. The other is the property of the Panama Railroad Company. It is very small, accommodating about twenty patients, has three or four private rooms, and the facilities for surgical work are very poor. Patients from American men-of-war will be admitted if necessary, the charges being $2 per day.

If our Government intends to build a canal and chooses the Isthmus of Panama as the route, every physician who has seen the situation owes it to humanity to report the present sanitary conditions and give his ideas or opinions as to the best way in which death and disease may be avoided, both after and while the canal is in the course of construction. In order to save many lives, I believe it necessary to purchase five miles of territory on either side of the proposed route and thus have a sufficient area under the laws of the United States. The numerous small towns that now line the railroad would then have to abide by adequate sanitary laws, and the many ways in which disease is now propagated would then cease to exist. This would not only protect the laborer who will dig the canal, but after its completion protection will be afforded to those in transit, and so to the whole world. The next great object would be to rid the country of mosquitoes, either by draining the swamps and other infested places, or, if this cannot be done, by killing their larvæ by the best means which experience in our own country and Cuba has taught us. I do not believe the swamps can be satisfactorily drained until the canal is complete, for the reason that there is an enormous rainfall during the entire year, the only difference between the wet and dry seasons being

that in the latter it rains most of the time, while in the former it rains all the time. If it is found impossible to destroy the mosquitoes, then laborers and other individuals must protect themselves from inoculation by covering their hands with leather gloves and protecting their faces and necks by means of mosquito netting.

THE PREVENTION OF EPIDEMICS.

By J. M. Cooper, M. D.

In the battle so valiantly waged against contagious diseases by the various health boards there is no feature so discouraging as the seeming indifference of the general public to the now well-known truth that some of the most fatal communicable diseases are entirely preventable, if the means advised by all sanitarians would be used to that end.

Chief among the constant, yet controllable, menaces to human life and happiness we find smallpox and typhoid fever, both of which, unfortunately, are too well known in Western Pennsylvania to need any graphic description at this time. The former is a malady so generally dreaded, owing to its usual loathsome character, that even the name—smallpox—conveyed to the mind by eye or ear, incites at once a feeling of horror.

And yet this disease, long since, in all civilized countries, should have been completely eradicated.

It is now over 100 years since Dr. Edward Jenner, of Berkeley, England, succeeded in convincing the scientific world of the inestimable worth of vaccination as a means of preventing smallpox, after 30 years of persistent effort in the face of bitter opposition and discouragement caused by the scoffing skepticism of those who should have been the first to proffer aid in his experiments.

It is a well-known historical fact that prior to this wonderful discovery smallpox was, for hundreds of years, one of earth's harrowing scourges, thousands dying from the onslaught of a single epidemic. It was the dread of the armies in those days, as its approach presaged a far greater loss of life than could be wrought by any martial foe. But notwithstanding the well-proven merits of vaccination, and so well established in the opinion of the best observers as to call forth the recent remark from a well-known writer on public sanitation, that "next to the rising of the sun, nothing is more absolutely certain than the fact that success-

ful vaccination, with reliable lymph, repeated with sufficient frequency, is a sure preventive against smallpox," we still have frequent visits from these epidemics, though not so destructive to life as formerly; occuring now mostly in the form of varioloid.

That this abatement has been brought about through the agency of vaccination there is no doubt, but if it were more frequently and more diligently applied, even varioloid would soon be stamped out. The fault is not now so much a lack of confidence in the efficacy of vaccination as an over-confidence in its power to produce a lifetime immunity, as the result of a single inoculation in childhood. This is very clearly shown in the preponderance in the number of adults who are, in the present day, the subjects of varioloid, although naturally, when unprotected by vaccination, the young are by far the most susceptible to attacks of smallpox; which all quite forcibly demonstrates the necessity of frequent, and, in the presence of an epidemic, universal, vaccination.

Smallpox is one of the so-called self-protective diseases, such as measles, chickenpox and a few others that are mostly the legacy of childhood, that is, a disease one attack of which renders the subject immune against a return, of like character, for life, with very few exceptions. Now, vaccinia, or cowpox, while it certainly protects against smallpox, and always modifies the attack, should it occur, is not in itself any species of smallpox in any grade or form, and therefore should not be expected to leave the same profound and permanent impress upon the system as the true disease. A person unprotected by vaccination or prior attack of smallpox, may contract the disease in its most violent form from exposure to varioloid, or modified smallpox, but the most direct contact with a case of vaccinia, or even with vaccine lymph itself, will not produce the true disease in any form. Hence the only sure protection to be derived from vaccination is in its frequent use. This is certainly not a very rigid exaction, in consequence of the benefits assured, and by a simple and absolutely safe measure, that seldom causes the loss of a single day from school or business.

As before stated, it is the robust and active adult who is usually exposed and subject to this disease. This occurs through the requirements of daily life, mingling in crowds, traveling in public conveyances, and from an unprotected state of the system by reason of the inefficiency of an effete vaccination. Children of the school age are better safeguarded in this respect, on account of the enforcement of the vaccination school law. Of course, there are always a few non-believers in the merits of vaccination, who prefer

to keep their children from school rather than submit to the requirements of the law. But the influence of this perverse minority is neither felt nor feared, for, in this enlightened age, it is not unbelief that is so much dreaded by the progressive part of a community, as indifference on the part of those who have the same interests at stake, and this is manifested not only as regards vaccination, but in every sanitary measure advised for the prevention or control of disease.

This is one of the enigmas of our modern civilization, which possibly may be attributed to the resentment arising from a supposed trammeling of personal rights and liberties, which strangely seems to apply solely to hygienic laws. All others are readily complied with, except by the criminal class, whose influence and example are not supposed to carry much weight in the efforts put forth for the general good of mankind.

The school laws, for instance, are always stoutly upheld, with all their entailed expenses, while, on the other hand, pecuniary aid, for public sanitation, is just as certain to be grudgingly given, when it has been known, and undisputed, since the palmy days of Greece and Rome, that the robust body is just as important a possession as the educated mind. The idea of waiting till the dog bites you and then killing him, instead of making a liberal use of tether and muzzle, seems to be adopted as the popular plan of dealing with contagious diseases.

But it is a fearfully fatal as well as expensive plan, and it is high time there should be some earnest thinking, with commensurate acting, along this line. In regard to protection from smallpox, no one need wait for the community at large, or even his neighbor, to act. Each individual can be his own and his family's protector by resorting to thorough and successful vaccination. But against typhoid fever the single citizen is not so directly the guardian of his own household, as this disease is nearly always caused by the use of impure water for drinking purposes, and in the larger and more densely populated centres, where typhoid fever is ever present, the water supply is generally regulated and controlled by municipal or private corporations. This, however, does not entirely release the individual from all responsibility in the matter, when he is once convinced of the dangers that exist and the culpable negligence of those in position to bring about a healthier and happier state of affairs. He can have his say and his vote, and should consider himself as particeps criminis if he fails to exercise both fearlessly and honestly when and where they will do the most

good. There is no reasonable excuse for any large town or city to continue the use of water where there is a question as to its purity, or where disease germs are known to exist. If the topographical conditions do not assure an adequate supply from mountain springs or artesian wells in the valleys, the filtering process, as a last resort, can and should be adopted, and if the proper germ filtration is faithfully used the number of typhoid cases will soon be reduced to a minimum.

It is officially estimated and affirmed that the annual number of typhoid fever cases is at least 3,000, and from 30,000 to 40,000 sick of this fever each year in Pennsylvania. Allowing an average of 36 days for each of these 40,000 cases we find that for every day in the year there is an army of 4,000 citizens of the State battling for life against the invasion of an enemy that is powerful enough to give the death blow to one-tenth of their number. This army of 4,000 is an aggregation chiefly of those in the prime of life, and not the dependents and physical weaklings of the commonwealth, or those hopelessly enfeebled by prolonged suffering from organic diseases. The robust and strong adults of the family, often the father or mother, whose daily support can be ill spared, are too frequently the victims of this prevalent and yet preventible disease, which being primarily enteric in its nature makes its attack upon those whose functions of digestion are most active.

As will be noted the statistics here given apply to the State at large, which means one death from typhoid fever to each 2,000 of an entire population of 6,000,000. But it is well known that in the cities the percentage is much greater, for instance in the small city of Meadville, with a population not to exceed 12,000, the number of deaths attributed to typhoid fever during the year 1902 was 12, one for each 1,000 of population; for Pittsburg and Allegheny, even their own citizens will admit the proportion of typhoid cases to the entire population to be equally as great as in Meadville, which would indicate that yearly there occur 500 deaths and 5,000 cases of sickness from typhoid fever in the twin cities of Allegheny county.

In Meadville the water supply from the Venango river has been pronounced impure by competent chemists. This happily is soon to be corrected by a change to pumping from a subterranean stream of absolutely pure water, and which is amply sufficient in volume for all the needs of the city.

Pittsburg and its adjacent cities have had enough typhoid for a

number of years past to give rise to a general and rather unfavorable criticism in that connection. The source of the trouble, as in all cities, doubtless is not hard to find, and it is to be hoped, as in Meadville, a remedy will soon follow.

The direct or indirect discharge of sewage into wells and rivers, as a contaminating source of disease, is too well known to need further comment. It is a hackneyed subject upon which the people are generally informed. It now remains for them to act. It is to be hoped we will all learn to appreciate the greatest blessing in the world—good health—which assures, in conformity with the well-known maxim, "a sound mind in a sound body," and which can only be had by the most diligent application of the rules of public sanitation. May the time soon come when the people will be willing to contribute freely and cheerfully to this grand achievement—the prevention of disease.—Pittsburg Post, September 6, 1903.

CONFERENCE OF STATE AND PROVINCIAL BOARDS OF HEALTH OF NORTH AMERICA.

Eighteenth Annual Meeting, Held at Baltimore, Md., October 23 and 24, 1903.*

The Conference met in the hall of the Medical and Chirurgical Faculty of Maryland, and was called to order by the First Vice-President, Dr. John Guitéras, of Havana, Cuba, in the absence of the president.

An address of welcome on behalf of the Faculty of the University of Maryland was delivered by Dr. JOHN F. CORDELL, who, in referring to the early medical history of Maryland, stated that the Medical and Chirurgical Faculty, organized in 1802, was the first body of the kind to give a formal indorsement to vaccination. As a matter of equal importance, he mentioned that papers were written in 1807 by John Crawford advocating and favoring the animalcular theory of disease. These papers were published in a non-medical journal, for the reason that the editor of no medical journal at that time would accept them. Crawford was erratic, but considered far ahead of his time. He was the first in any English-speaking country, so far as the speaker knew, to advocate the germ theory of disease. Crawford antedated Lister by at least fifty years, as a perusal of his writings would show this.

*From Special Report, "Medical Record," Nov. 7, 1903.

Dr. WM. H. WELCH, of Baltimore, followed with an address of welcome on behalf of the State Board of Health of Maryland. He said, among other things, there was another name which should be mentioned in connection with the medical history of Maryland that of John K. Mitchell, father of Weir Mitchell, whose book on the "Cryptogamic Origin of Malarial Fever" was really a classic. He thought Mitchell's name should be coupled with that of Henle, who forecast the doctrine of *contagium vivum.*

The First Vice-President responded briefly to these addresses of welcome.

Etiology and Prevention of Infantile Diarrhea.—Dr. JOHN H. MASON KNOX, of Baltimore, read a paper on this subject. He said no single organism was considered to be the cause of infantile diarrhea until the experimental work of Duval and Basset. Following Shiga's work in 1898 the dysentery bacillus was found to have wide distribution, and from year to year the distribution of the organism had been found to be more general. Reference was made to the investigations of Flexner in the Philippines in relation to dysentery among soldiers and the Shiga bacillus as a cause of it. Subsequent investigations made by bacteriologists in Germany, China, Constantinople, etc., disclosed the existence and prevalence of this bacillus in epidemic dysentery, so that its pathogenicity was now well established. At the suggestion of Flexner, the speaker and others undertook a series of investigations at the Wilson Sanitarium, and of fifty-three cases of diarrhea carefully examined, the Shiga organism was found in greater or less number in forty-two. Careful clinical examination, however, showed definitely that no one type of the disease could be associated with this organism, and that intestinal diseases of all types, common among children in summer, were caused by the same organism. Laboratory investigation had shown two or three types of organism very closely related. Thus far the great majority of cases in babies had been the acid Harris type. It was found that not only during the summer, but in the winter, sporadic cases of infantile diarrhea were associated with this organism. Wolfstein had reported thirty-seven sporadic cases of infantile diarrhea occurring in winter, and Basset four cases, seen in the Johns Hopkins Dispensary, due to this organism. Shiga, by the serum treatment, had reduced the mortality of dysentery from 20 to 30 per cent. to 10 and even 7 per cent. In twenty-five cases treated by injections of serum at the Wilson Sanitarium, some betterment was noticed after the injection in the cases that were seen early, but the improvement was not

brilliant or startling. In eight cases the serum had a beneficial action. In connection with the serum there were changes made in diet, and other medication was used, so that the results obtained were confusing in their interpretation. In cases of long standing, associated with an inflammatory condition of the intestinal tract, in which there was probably ulceration, blood in the stools, etc., the serum was of no avail. Although the serum treatment was not very beneficial, it was harmless, as no deleterious effect was observed in any of the cases.

Are the Laboratory Methods of Diagnosis in Infantile Diarrhea Applicable in Public Health Work?—Mr. EDWIN G. SCHORER, of Baltimore, in a paper on this subject, said that with the establishment of the etiology of infantile diarrhea, a great step in advance had been made, yet under the present conditions the new methods of diagnosis were not practicable in public health work. This last statement might, however, be modified, inasmuch as a bacteriological diagnosis would undoubtedly be of value in the limited number of persistent cases of diarrhea, and in those in which the antidysenteric serum was to be given. For this purpose the mailing case of Dr. Parks was to be recommended. The fact that, at the present time, the methods were not available for general diagnostic purposes, ought not to discourage any one from complying with any request boards of health might make. Much was still to be learned in regard to the dysentery organism and infantile diarrhea, a good share of which could be furnished by statistics obtained and facts learned from local boards of health.

Dr. WILLIAM H. WELCH, of Baltimore, said it was a surprise to him that Dr. Knox had found the organism, which had been proven to be the cause of a prevalent group of cases of dysentery, to be the cause of summer diarrheas of children as well. One did not think of the ordinary summer diarrhea of children as belonging to the same group of cases as adult dysentery. The organism must be found in other localities than Maryland in order to demonstrate that it had any causal relation to infantile summer diarrhea. The serum treatment of this disease, according to Flexner, was disappointing. The best results had been obtained in the treatment of adult dysenteries. Instances had been reported by Holt, Thayer, and others in private practice in which the serum seemed to have had a marvelous effect. Conditions in hospital and dispensary practice, however, were unfavorable for obtaining satisfactory results with serum.

Dr. HENRY M. BRACKEN, of Minneapolis, referred to the milk

question, saying in the larger cities it was difficult to get a pure milk supply. What was generally known as certified milk was one of the best articles of artificial diet for children. At present much attention was being paid in some cities to securing a pure milk supply by excluding tuberculous cows from dairies. But even this would not insure a pure milk supply, by any means. The testing of dairy herds for tuberculosis might be satisfactory to the dairymen and seemingly protect the people, but there were more infants that died every year from impure milk than from tuberculous milk. More attention should be given to the sanitary aspects of the dairy than to the diseased animal. Certified milk and Pasteurized milk were as satisfactory articles of diet as could be obtained at the present time.

Dr. JOHN N. HURTY, of Indianapolis, Ind., cited an instance showing that typhoid fever and dysentery (epidemic) could be conveyed by flies as well as by polluted water.

Dr. CHARLES O. PROBST, of Columbus, Ohio, considered it very important to disinfect the stools in cases of infantile diarrhea, although Dr. Knox had not referred to it. He understood Dr. Knox to say that the Shiga bacillus inhabited the healthy intestinal canal, and that under certain conditions of environment it might take on pathogenic properties. He asked whether this was so or not.

Dr. GARDNER T. SWARTS, of Providence, R. I., understood that the Shiga organism was easily killed in the presence of other bacteria, as the colon bacillus, which was a common inhabitant of the intestinal canal. If the Shiga organism was so easily killed in the presence of other bacteria, why did it prevail so extensively?

Dr. S. R. TOWN, of Omaha, cited an epidemic of diarrhea which occurred in Chicago many winters ago, which was caused apparently by the discharge of a large quantity of surface material into Lake Michigan.

Dr. JOHN N. HURTY cited a similar epidemic which occurred in Michigan City, Ind. There were no less than three thousand cases of diarrhea from polluted water.

Dr. HENRY D. HOLTON, of Brattleboro, Vt., thought that infantile diarrheas were considered gastrointestinal diseases, and that dysentery simply applied to bloody flux, which was not common in infants, but was sometimes seen.

Mr. FRANK WELLS, of Lansing, Mich., said the Michigan State Board of Health had published a leaflet on the subject of infantile diarrhea as the result of a report made by Prof. Victor C. Vaughan. This leaflet, which had been *given wide circulation*, advised that all

cow's milk given to infants shall be pasteurized. The leaflet was furnished to all the teachers of public schools in Michigan. It was the duty of boards of health, he thought, to furnish such information to the people.

Dr. HENRY MITCHELL, of Asbury Park, N. J., urged repeated inspections of cases of diarrhea in children and adults, as in cases of typhoid fever. The New Jersey Legislature had given the State Board of Health authority to make such inspections. A law had also been enacted that no milk shall be sold from premises on which there was an impure water supply. He pointed out how this law could be so interpreted as not to be effectual in its administration.

Dr. Knox, in closing the discussion, emphasized the importance of good milk and pure water for children, as well as adults. Common house flies were carriers of disease; they were a source of contamination in many instances. Proofs of this were abundant. Replying to Dr. Probst, he said the disinfection of stools in cases of infantile diarrhea was as essential as in typhoid fever. In speaking of dysentery he had not meant to confound it with bloody flux, as intimated by Dr. Holton. He used the term dysentery to include those cases in which the Shiga bacillus was found to be present. He could not answer satisfactorily the question of Dr. Probst relative to the Shiga organism inhabiting the healthy intestinal canal, but hoped Professor Welch would do so.

Dr. Welch said the Shiga organism was not present in normal stools. If it was, it was in such small numbers that it required the most painstaking investigation to find it.

Mr. Schorer cited an instance explaining why the colon bacillus killed the Shiga organism. The organism of dysentery was found in the mucous coat of the intestine, while the colon bacillus might be found in any part of fecal matter.

The Duty of Sanitarians Regarding Venereal Diseases.—Dr. HENRY D. HOLTON, of Brattleboro, Vt., read a paper with this title. He emphasized the duty which should be recognized by sanitarians as resting upon them, of doing something to restrict the venereal diseases which threatened society as no other communicable diseases did. The vital statistics of New York City in 1900 had a record of 31,145 cases of contagious diseases, with 11,368 deaths, of which only 177 were from syphilis. Blascho claimed 150,000 syphilitics for Berlin, and the Committee of Fifteen, 200,000 for New York City. To get an approximate idea of its prevalence the Prussian Government requested that all physicians should report on August 30, 1900, every case of venereal dis-

ease coming under treatment. These reports proved that three-quarters of a million people were afflicted yearly with venereal diseases in that country alone. He said the foregoing statements would prove that venereal diseases stood next in prevalence to tuberculosis and alcoholism, if they did not surpass them. They were permeating the very root of the population, tainting those yet unborn, maiming those born with the virus already in their blood, deteriorating the race, and devitalizing the individual. Instruction should be given in high schools and colleges, having reference to the prevention of these diseases. Dr. Prieto, in a paper read at the International Medical Congress at Madrid, suggested the following regulations to be enacted into laws: (1) The law to declare the infection of any person with any form of venereal disease to be a crime. (2) That such crime against the person be punished by indemnification and imprisonment for a period of two years. (3) When the offender could not indemnify the injured person by bearing the expenses of treatment, that the term of imprisonment or transportation be increased. (4) That the brothel-keepers be made to indemnify any person infected on their premises or by any of their licensed women, and in case of insolvency of the brothel-keeper, imprisonment or fine should be enforced. Dr. Holton thought the rules of Prieto stringent enough to control the evil. However, to enforce them would require an enlightened and educated public sentiment. He would educate the medical profession and educate the public, and follow this work by the enactment of wise laws which the educated public sentiment would insist should be thoroughly executed.

This paper was discussed by Drs. John S. Fulton, George R. Dean, G. P. Conn, Frank Wells, E. W. Cooper and Charles O. Probst. The general trend of the discussion was the necessity of educating the medical profession and the public in regard to the terrible ravages of venereal diseases and the practicability of limiting their spread by legislative enactment.

Dr. PROBST then offered the following preamble and resolution, which were adopted by the Conference:

Whereas, The great prevalence of venereal diseases, which is indirectly the cause of many deaths, is a matter of much concern to the public health, and,

Whereas, The communication of these diseases to innocent persons must be largely due to ignorance, be it

Resolved, That a committee of three be appointed by the President to prepare a leaflet that would be acceptable to physicians to

give to their patients, setting forth the precautions to be taken by one suffering from a venereal disease to prevent its communication to others, and to make such other suggestions as it may deem proper. Such instructions, when adopted by this Conference, to be recommended to State and Provincial Boards of Health for dissemination among the medical profession, and said committee shall report at the next meeting. (Committee unannounced.)

Another Year's Test of the Mosquito Doctrine of the Transmission of Yellow Fever in Havana.—Dr. JOHN GUITÉRAS, of Havana, Cuba, said there had not been a case of yellow fever in Havana for the past two years except those that had been imported from other countries, chiefly Mexico. He then detailed the methods employed in combating this disease in Havana, which are familiar to our readers.

Report of Committee on Promotion of Uniformity of Reports upon Vital Statistics.—Dr. CRESSY L. WILBUR, of Lansing, Mich., presented this report. In the division of labor between the committee representing this Conference and the committee of the American Public Health Association, American Medical Association, and others interested in the improvement of vital statistics, the special task had been selected of examining and reporting in regard to the forms of tables and general manner of presentation of statistical data employed in the annual, biennial, weekly, monthly, or other reports of States and cities. In this the U. S. Census Bureau had co-operated and had collected samples of the forms at present in use in nearly all of the registration offices of this country for the purpose of analysis and study by this committee. It was a difficult task to consider all of the forms in a comparative way, but it seemed desirable to do so before formulating a report as to the absolutely essential tables that were to be recommended for use in the various reports. The committee, therefore, reported progress and requested that additional time be granted for making a final report, which could probably be prepared before the next session of the Conference. In addition to the work outlined above, the committee had co-operated, on behalf of the Conference, with the committees of the American Public Health Association and of the American Medical Association, the U. S. Census Bureau, and the Public Health and Marine Hospital Service, in the preliminary work for the co-operative study and improvement of the international classification of causes of death, a report upon which would be presented at the session of the American Public Health Association next week, and also for the extension of adequate registration laws. The report was accepted.

Transportation of the Dead.—The conference adopted a set of rules, which it was proposed should be established by legislative action, to govern the transportation of dead bodies.

Officers.—The following officers were elected for the ensuing year: President, Dr. John N. Hurty, Indianapolis, Ind.; Vice-President, Dr. John S. Fulton, Baltimore, Md.; Secretary, Dr. Gardner T. Swarts, Providence, R. I.; Treasurer, Dr. James A. Egan, Springfield, Ill.

The time and place for the next meeting were left to the officers of the Conference to decide.

FINAL REPORT OF THE COMMISSION ON ADDITIONAL WATER SUPPLY FOR THE CITY OF NEW YORK.

For $98,839,000 the city of New York can be provided with a daily supply of 500,000,000 gallons of filtered water, delivered by gravity through a high level aqueduct to a large reservoir at the north end of the city at an elevation of 295 feet above tide water, thus supplying the highest parts of the city by natural pressure. For $60,098,000 a daily supply of 320,000,000 gallons, under like conditions, can be provided. Such are the estimates of Prof. Wm. H. Burr and Messrs. Rudolph Hering and John R. Freeman, Members American Society Civil Engineers, in their final report on an additional water supply for New York City.

The preliminary report of the commission was published in full in "Engineering News" of October 1, 1903. The final report was recently completed, and we are indebted to the commission for an abstract of it, and for a map showing the location of the various reservoirs, the filters and the aqueduct. The brief abstract of the final report covers much the same ground as did the long preliminary report, but the final report contains conclusions and estimates of great interest.

The commission was instructed to report on water waste restriction, as well as on an additional supply. It advises that the investigations of consumption and waste, under the immediate supervision of Mr. Nicholas S. Hill, Jr., Chief Engineer of the Department of Water Supply, Gas and Electricity for Manhattan and the Bronx, be continued, and that a system of thorough inspection should be installed, as well as a large extension of meters, not only in buildings, but also so placed upon the street mains as to divide the city into districts, the quantity of water flowing

into each being measured. By these means it is believed that th greatest possible reduction in waste will be attained. As a matte of fact, the present investigations do not show nearly as muc waste as has sometimes been anticipated. The leakage from stre mains has so far been found to be small, the chief waste appearin to arise from leaky fixtures and defective plumbing in building The total actual amount of leakage and waste discovered scarcel exceeds about 40,000,000 gallons daily for the Boroughs of Mar hattan and the Bronx. As the consumption of Manhattan and th Bronx at the present time is about 285,000,000 gallons daily, th waste represents about 15 per cent. of the consumption.

The Proposed Gravity Supply.—The general outline of the pla for a new gravity supply, with a summary of the estimates of cos is presented in the abstract of the report as follows:

The Commission favors taking a first instalment of 600,000,00 gallons from the Fishkill watershed, but developing concurrentl the supply from Esopus creek. These two sources would giv nearly 320,000,000 gallons per day. Another 100,000,000 gallon per day may be secured from Rondout creek without great add tional expense, making a total supply of nearly 420,000,000. Th final 80,000,000 gallons or more may be obtained from Wappi gers creek by means of a large reservoir at Hibernia, within th drainage area of that creek, thus completing the amount of 500 000,000 gallons per day. If it should be desired, a further larg supply can be obtained from the upper watershed of the Janse Kill, on the easterly side of the Hudson, and from the upper wate of Schoharie creek, diverted into the watershed of the Esopu creek, and from Catskill creek.

The waters of the three creeks on the easterly side of the rive are much harder than the Croton water, but the waters of Rondou and Esopus creeks are remarkably soft and desirable for city sup ply. It has been the Commission's plan to deliver to the city th soft waters of the Catskill mountain streams, so as to reduce th hardness of the combination with the waters on the easterly sid of the Hudson, thus securing a supply equally soft as the Croto water.

The Commission is strongly of the opinion that after the wate of the streams now recommended for use are taken, Hudson Rive water should be secured by pumping it out of the river near Hyd Park up to the suitable reservoirs and filters on the high land eas erly of the river, so as to deliver it to the city at the required eleva *tion.* This, however, is in the remote future, and is set forth as

resource in reserve at that time. In such a development it will be necessary to build large storage reservoirs in the Adirondacks, from which flood waters of the Adirondack streams may be released during the summer flow of the Hudson, so as to prevent any salt water from reaching the point where the pumps would take the river water. It is explicitly stated in the report that the filtration of Hudson River water would render it entirely satisfactory for all purposes.

Summary of Costs.—The works recommended to be constructed first comprise a section of the Hill View Reservoir, of 600,000,000 gallons capacity; the main aqueduct, of 500,000,000 gallons daily capacity; from that reservoir to Stormville Reservoir; a section of the Stormville filters, of 50,000,000 gallons daily capacity; the twin aqueduct, one channel of 400,000,000 gallons and the other of 250,000,000 gallons daily capacity, from the Stormville Reservoir to the Billings Reservoir and these two reservoirs. This construction will afford an additional supply of 60,000,000 gallons per day. Concurrently with the preceding construction, the aqueduct of 400,000,000 gallons daily capacity should be built from the Billings Reservoir to the Ashokan Reservoir, and at the same time the latter reservoir should also be under construction.

It is estimated that the first part of this work, *i. e.*, extending from Hill View Reservoir to Billings Reservoir, may be built, under efficient management, within five years, and that the second part of the construction, extending from Billings Reservoir to the Ashokan Reservoir, may be completed within the same period, if the labor market affords sufficient force and the money is provided.

The summary of costs of this construction is as follows:

RESERVOIRS.

Hill View covered reservoir, first section of 600,000,000 gallons capacity..	$9,059,000	
Stormville filter plant, first installation of 50,000,000 gallons daily capacity....	3,581,000	
Stormville reservoir, 10,000,000,000 gallons capacity	2,503,000	
Billings reservoir, 6,800,000,000 gallons capacity	1,806,000	
Ashokan reservoir, 66,500,000,000 gallons capacity	11,734,000	
Total		$28,683,000

HIGH LEVEL AQUEDUCT.

From Hill View to Stormville filters....	$18,755,000	
From Stormville to Billings, twin aqueduct	3,584,000	
From Billings to Ashokan, including Hudson River crossing.....	9,076,000	
		31,415,000
Total cost of construction.....		$60,098,000

These estimated costs include actual contract and all other expenditures, except those for damages to water rights. These works will afford an additional supply of nearly 320,000,000 gallons daily.

It is estimated that the complete construction of reservoirs, filters and aqueducts for the full additional supply of 500,000,000 gallons per day may be required by 1925. The cost of the remaining construction in excess of that already provided for will be as follows:

RESERVOIRS.

Hill View Reservoir, completed to 2,030,000,000 gallons in 1925.....	$4,110,000	
Stormville filters, completed to 500,000,000 gallons daily capacity in 1925...	11,065,000	
Hibernia Reservoir, 30,500,000,000 gallons capacity.....	9,308,000	
Silvernails Reservoir, 17,200,000,000 gallons capacity	5,530,000	
Total		$30,013,000

AQUEDUCTS.

Additional cost for completed aqueduct between Hill View and Stormville...	$1,510,000	
Additional cost for completed aqueduct between Billings and Ashokan.....	4,369,000	
Aqueduct from Billings Reservoir to Hibernia Reservoir, 300,000,000 gallons daily capacity.....	1,573,000	
Aqueduct from Hibernia to Silvernails, 220,000,000 to 330,000,000 gallons daily capacity	1,276,000	
		8,728,000
Total cost of additional construction is.....		$38,741,000

These additional costs, like those covering the first portions of the work to be constructed, include all expenditures such as those for land, clearing reservoir sites and other similar costs except water damages along the streams from which the additional supply is taken.

The total cost of the entire works required to deliver the additional high service supply of 500,000,000 gallons per day will be the sum of the two preceding totals:

Total cost of entire work.....$98,839,000

If instead of developing the Jansen Kill it should be considered preferable to take the soft waters of Rondout Creek, the preceding estimates of cost would be modified to the extent of substituting the expenditures necessary to secure the Rondout water for those required to secure the Jansen Kill water. The Commission believes that this procedure will be found to be preferable; but the impossibility of completing Rondout surveys does not permit accurate estimates to be made for securing the Rondout water.

The needs of the city, the Commission states, demand the immediate beginning of construction. This can be so carried out as to deliver 60,000,000 gallons a day into the Croton drainage area in about five years, the shortest period during which long tunnels through the mountains east of Peekskill could be built. The construction required for the full supply of 500,000,000 gallons need not be completed before 1925.

The high pressure gravity supply would not only eliminate the need for pumping in Manhattan and the Bronx, but would also furnish "a supply for special fire mains, thus affording much better protection against fire than any salt water fire system."

Brooklyn, Queens and Richmond Boroughs.—As to these boroughs, the abstract of the final report says: For Brooklyn and Queens, an immediate development of the ground water sources of Queens and Nassau counties is recommended, and that all surface supplies be filtered, also that ultimately these Long Island sources be supplemented by a branch conduit from the proposed 500,000,000-gallon aqueduct from the north of Manhattan.

For Richmond, the Commission has approved of a ten-year contract with a private company for the immediate introduction of filtered water from New Jersey.

Queens, the Commission says, already urgently needs more water, and the Borough of Brooklyn has also reached that point where it must have additional water of good quality. It has al-

ready begun to filter its present surface supplies, which are more or less polluted by the increasing population of the southern portion of Nassau County.

The Commission takes a strong stand on the value of well-chosen underground waters, points out the high character and large amount of underground water stored by nature on Long Island, and mentions briefly the large amount of work done under its direction in the way of studies of these underground sources. These studies have covered 1,000 square miles of territory, and have included observations of the water levels in nearly 1,500 wells.

Filtered Water for the Whole City.—The Commission practically asserts that at the present time no municipality can be considered satisfactorily supplied with water until that supply is either filtered artificially or naturally, as in the case of ground water.

Its recommendations include an ultimate filtered (natural or artificial) supply for the whole city, and it strongly urges that works for the filtration of the Croton supply be begun at once. It also advises that the reservoirs in Central Park be cleaned and that they be roofed over as soon as the Croton supply is filtered.—Abstract from "Engineering News," December 24, 1903.

THE PROBLEM OF KEEPING NEW YORK CITY'S STREETS CLEAN.*

By Dr. JOHN H. WOODBURY, Commissioner of Street Cleaning of New York.

Former Conditions.—Dr. Woodbury gave a series of stereopticon pictures in which he showed the condition of New York streets when he took charge of them two years ago. Hester street, at that time, was a crowded thoroughfare constantly filled with a compact mass of people, crowded around the push carts, so that it was impossible to properly clean it. Rivington street was the same way. Along the curbs of both these streets there were open market carts, adding further by their refuse to the difficulty of cleaning the streets and keeping them clean. Dr. Woodbury dwelt on the fact that streets were the public highways and that the abuse which allowed push-carts in large numbers on them was an unwarranted diversion from the true purpose of maintaining a thoroughfare.

Establishment of Fish Market.—On Rivington street especially,

*Abstract of paper read at special meeting of New York Academy of Medicine, December 3, 1903.

the nuisance of the push-carts became greatest, because here all the fish food was sold for the neighboring streets of the crowded lower East Side. Fish in all stages of decay were offered for sale in the midst of a dusty, dirty thoroughfare, and the waste material from the sales inevitably found its way to the street to add further to the noisomeness of the conditions. In order to do away with this nuisance and make the maintenance of clean streets in this neighborhood possible, Dr. Woodbury established Rivington Street Fish Market, beneath one of the arcades of the new Williamsburg Bridge. At first it was impossible to make the foreign-born peddlers understand that this new market was intended for their use without any payment. After a few of them had experienced what was the real purpose of the change the others flocked in, and now it is not so difficult to keep the streets clean and clear in the neighborhood. Dr. Woodbury insists that other such improvements must be made in other parts of the city, and that markets for other food materials must also be established. Many food materials have been sold from these push-carts on the open streets, and the number of germs present in the air in these crowded thoroughfares makes this eminently undesirable. Bread, cakes, biscuits and candies are exposed, and various forms of delicatessen. The children are likely to suffer most from such street-exposed food, as they are least resistive to bacterial invasion, and are less likely to be squeamish about what they eat. Thus the matter of street cleaning becomes very important in the summer time for the maintenance of the public health. It must not be forgotten that a city's health is the function of its most unhealthy portions, and that the slums of the lower East Side may easily prove a source of infection even for upper Fifth avenue.

Street Cleaning Methods.—The Commissioner of Street Cleaning must maintain the cleanliness of 1,076 miles of streets. In the more crowded portions of the Borough of Manhattan, particularly, many of these streets must be cleaned twice a day. Wherever the old block pavement remains the only possible way of securing cleanliness is by the man with the broom, the shovel and the bag. In very crowded streets the same thing is true. It is impossible to send a street-cleaning machine through Fifth avenue in the busier portions of the day. The employment of so many men requires organization and *esprit de corps*. The men employed must be treated as if part of a military company and discipline maintained by military methods. So much was accomplished in establishing this system by Colonel Waring, however, that now it is not diffi-

cult for his successors, if they have the good will, to maintain it. It is important that asphalted streets should be thoroughly cleaned, in blusterous weather particularly, as the dust from them is likely to be even more noticeable than from rougher paved streets. The dust represents to the medical men a collection of many kinds of germs. For cleaning asphalt, when the temperature is above 50°, the only thing that is effective is a stream of water delivered at high pressure over the surface of the pavement. For this purpose street-cleaning apparatus in which water can be kept at a pressure were invented by the French, and are now in use in this city. Several of them were exhibited in pictures that delivered a stream of water under 20 atmospheres of pressure. This forces the water toward the gutter line and thoroughly cleans the street. Water wagons are also employed, in front of the tank of which there is a gas engine, by which a pressure of 100 atmospheres can be secured in the water tank. This cleans asphalt very effectually. So far a lack of sufficient appropriation for the purpose has made it impossible to secure more than a few of these.

The Ash-Cart Nuisance.—Up to the present time the loading of ash-carts and the carting of ashes along the streets in the open carts has been one of the great city nuisances. Clouds of fine dust were blown about a little on everything, to be raised again by the wind and be a continuous bother and irritant for respiratory passages. On a March day a goodly proportion of the ashes seemed to get back into the air. The attempt to abate the nuisance by means of a cloth cover proved a failure. For a time then a wooden cover was employed beneath which the dumping of the ashes could be secured. As a result of various trials and experiments Dr. Woodbury has finally adopted a large steel wagon completely covered, and with a roll-top desk opening. This not only abates the nuisance of dust, but gets rid of the unsightliness of the old vehicle.

Disposal of Garbage.—Under the old system of carrying the garbage out to sea in dumps and scows there were many serious objections. Much of the material was carried back into the next tide to decorate the bathing beaches in the neighborhood of the city, and be not only a nuisance, but a source of danger to health. The floating material from these scows made the waters near New York unsightly, and the solid material, in the opinion of experts, was sure eventually to create a bar just at the entrance of the harbor. Under the system introduced by Dr. Woodbury these objections are all done away with. All the garbage material contained

in the ashes is taken out and the ashes are used for filling in near Riker's Island. Already a large amount of new ground has thus been made which will eventually be very valuable. In the meantime the dumping scows, especially those of the Delehanty pattern, are held in reserve for emergencies in case the present system should prove insufficient for some special reason, as, for instance, if a fire or some other serious unforeseen accident should cripple the department's resources.

Classifications of City Waste.—There are three classes of city waste that must be disposed of, each of which requires some different treatment. These are garbage, rubbish and ashes. By garbage is meant the kitchen waste of houses and hotels, commonly called swill. By rubbish is meant all the household material that, being no longer of use, is left to the street-cleaning department to dispose of. This includes beds, bedding, old furniture, old trunks, boxes and receptacles of various kinds, of different degrees of uncleanliness, and all the broken material of the household. Under ashes is included, of course, a certain amount of broken material, tin cans and other articles that do get inevitably into the ash pans.

Garbage Disposal.—All the swill material is now taken to Barren Island. This is all organic and extremely offensive material. Here, by means of a reduction process, the [illegible]y material and gases are taken out of it, and a compressed, i[illegible]orous residue obtained after the digestion of all the organic m[illegible]erial. In order to prevent the nuisance, formerly so marked, a[illegible]ll-smelling smoke from the Barren Island plant and the gas fr[illegible]a the digesters are thoroughly washed before being allowed to [illegible]scape into the air. This unfortunately leads to the loss of an immense amount of valuable ammonia. The sweepings of streets and other organic material constitute the best of manure and is now sold in quantities to many parts of the country. This forms a constant source of revenue.

Rubbish.—This material often contains articles that may still prove useful and always has in it an immense amount of valuable material for fuel. The handling of it is no longer not only not an expense, but is a source of revenue to the city, since a contracting company more than pays for the collection of it for the permission to take out of it any material that may seem of value. The residue is now being used for heating purposes and will surely prove of value. Even after the rubbish has been burned the residual ash has such a high potash content that it is an extremely valuable material.

Disposal of Ashes.—On February 14, 1902, the department began to dump ashes into an open crib near Riker's Island, for the purpose of increasing the size of the island. Sixty-three acres have so far been reclaimed from the ocean very effectually, though certain problems have had to be solved that were unexpected. The East River is deep and clear, and has little mud, but a strong tide. The setting in of this tide makes work difficult at Riker's Island, and one one occasion, at least, caused considerable damage to the construction work there carried on. The distribution of ashes and the leveling of the new-made ground is confided to convicts, the labor being cheap, but quite as poor as it is cheap. The convicts employed are mainly the tramps and vagrants. Belt conveyances are employed to distribute the ashes at a distance from the barges, and so far there has been excellent results obtained from them.

Street Bacteriology.—By exposing agar plates at varying heights from the ground, Dr. Woodbury succeeded in getting bacteriological maps of the atmosphere in the most thickly settled district. Hester, Rivington and Oak streets gave so many bacteria after thirty minutes' exposure that not more than fifteen minutes of exposure could be employed, and even then many hundreds of bacterial colonies developed on each plate. Exposures of the same kind made on upper Fifth avenue and Madison avenue gave very few bacteria and only a few molds. Pell street was found reasonably clear of bacteria, though containing a number of molds in the atmosphere. John Chinaman is not unclean, though the presence of organic products in his neighborhood, when living in thickly settled districts, may invite the presence of molds. Mulberry street, in the Italian quarter, gave an uncountable number of colonies after fifteen minutes' exposure, and a single hour's growth in an incubator. Washington Market proved to be nearly in the same condition, and the photograph of the plate taken shows what danger there is in the exposure of moist food products in the air under such circumstances. Many food materials are almost as good nutrient media for bacteria as agar is. As a rule the number of bacteria are directly proportional to the denseness of population in a given neighborhood. As a rule, too, these thickly populated districts fairly swarm with children. This adds to the danger to the health of the individuals, because the population contains such a large proportion of the young non-resistive elements. It is not an unusual thing on the lower East Side to have 20 families to every 25 feet street front, and these 20 families will number at least 50 children among them. This gives a better idea for the

necessity of cleanliness in these thickly populated neighborhoods and for the special vigilance of the Street Cleaning Commissioner, if the Board of Health is not to have its work greatly added to.

Utilization of Rubbish.—An experimental plant for the separation of whatever useful materials there might be in the rubbish collected in the street cleaning departments and the burning of all inflammable material has been established at Forty-ninth street. This furnished enough heat units to supply lights for the stable at Fifty-second street, leaving a large surplus of heat to be wasted. The bill for lighting this stable before was nearly $6,000 annually. This is a direct saving. It formerly cost the city about $500 a week to get rid of this material, while now the revenue from those who have the opportunity to select whatever useful material there is in it is $250 a week. When to this is added the new saving in the matter of lighting, the city will find this material an important source of revenue.

Experimental Work.—This is only experimental as yet, but there is no doubt that on a large scale it will prove even more lucrative than has been represented. The plant is situated on a dock over the river; it is inefficient according to our present scientific knowledge; it is not well located; it is not industrially well arranged, yet at the present time it is actually saving the department over $10,000 a year. This gives some idea of how much can be accomplished when the problem is approached scientifically. It is surprising how much of the waste material can be used over and over again. Even the tin cans that form so large a part of the rubbish collected by the Street Department are now shipped to a factory on Long Island, where, by means of heat, the solder and tin are melted off to be again utilized. Even the steel plates are not entirely useless, and are used for roofing purposes and other objects.

Problem of City Lighting.—One of the largest items of expense which the City Government has at the present is that of lighting. There is no doubt that much of this can be supplied by plants erected in connection with the rubbish disposal plants. As a consequence of this, too, the boxes and barrels, the floating material of various kinds that formerly used to be taken down the bay, and, after dumping into the ocean, floated back with the tide to be scattered over the beaches, making an unsightly condition and a very unhealthy state of affairs for the bather, can be destroyed under absolutely aseptic conditions, and their usefulness as fuel is easy to understand. Of course, during the two years that Dr. Woodbury has been in charge of the department only a beginning

of this scientific treatment of refuse has been instituted. The new administration, however, will find this beginning of such a nature that they can easily raise a superstructure of important retrenchment for the city within the Department of the Commissioner of Street Cleaning.

STEPS IN ATTAINING THE PHYSICAL IDEAL.*

By Mary Frazee.

In the working out of any purpose there are the three elements of a race: namely, a starting-point, a goal, and the movement from the one to the other. Stated more psychologically, it may be said that in the working out of a purpose there are three steps:

1. A consciousness of the self as limited in an undesirable way.

2. A mental image of the self as freed from the undesirable limit.

3. The selection and execution of the means necessary for the removal of the limit.

To illustrate:

1. An inebriate realizes that he is a slave to appetite; he is conscious of himself as limited in an undesirable way.

2. He imagines how it would seem to be master of his appetite; he imagines himself as free from his limitation. To realize himself in this freed condition now becomes to him an ideal.

3. He chooses and proceeds to execute the means necessary thus to free himself from his limitation and realize his ideal—he builds up his will power and his health in every way until his appetite is overcome.

Again:

1. A man finds himself hanging through accident by his clothing over the edge of a precipice—he is conscious of an undesirable condition of the self.

2. He idealizes himself as in a position of safety; he images himself as he would be if his limitation were removed. He compares condition 1 of the self with condition 2; he prefers himself in condition 2. He sets up condition 2 as an end to be reached.

3. He selects, according to his best judgment, the appropriate means and activities to transform his actual condition of peril to his ideal condition of safety; he proceeds to execute the selected

*Written for "Suggestion," December number, from which it is reprinted.

activities. By means of such selected activities he moves from point 1 of his experience to point 2; he finds his limitation gone—he realizes his ideal.

Whether a purpose set up be one to be accomplished in the individual or his environment, the three steps in reaching it are invariable. There is always first, a feeling of dissatisfaction—a consciousness of the self as limited undesirably; second, the setting up of the ideal, the thought of freedom from the limit; and third, the employment of the necessary means and activities to make the ideal condition actual. These are the steps by which we have accomplished all other things, and they are the steps by which—in the race and the individual—the physical ideal is to be attained.

I.

The average sick man would probably say that so far as the first step is concerned, he has no difficulty. He is quite aware of a feeling of dissatisfaction; he is conscious of himself as limited in an undesirable way. But precisely at this point he makes his first mistake: he is so engrossed with his actual condition, or what he believes to be his actual condition, that he fails to turn toward the ideal condition. His attention is riveted upon his immediate sensations. He thinks more of his present undesirable state than he does of his future deliverance. Now it bodes no good to a race if the runner be so absorbed with his starting-point that he fail to look toward the goal. A starting-point is only a thing to move away from; the sole purpose and use of a starting-point is to furnish a place to be left behind. Pain is only the sick man's starting-point to health. A glance at the nature of feeling shows the truth of this.

The purpose of sensation of any kind is only to indicate that something is to be done. *Feeling is only a hint to action.* It is the demand of the organism for some readjustment to its environment. A feeling of hunger is simply a notice that the maintenance and furtherance of the self requires that food be taken. The feeling of pleasure aroused by listening to a Brahms recital is an indication that to listen to fine music is conducive to a high degree of development. To use a more common illustration—and one of sight sensation—to see a mud-puddle in the path is a suggestion to walk around it. All that we see and hear and taste and smell and feel—all sensation—is to show us something that our well-being demands we should either reach out after or avoid. This—the temporary sensations of pleasure from the indulgence of depraved

appetite excepted—is the psychological meaning and evolutionary value of sensation. To keep attention fixed upon suffering itself is not only to aggravate and intensify that suffering, but it is to wrongly interpret its meaning. It is only a starting-point, a stimulus, a hint, an invitation to something better.

II.

And that something better is health, strength, physical perfection—the realization of the Physical Ideal. It is possible to be reached by mankind because it is necessary to be reached. The continuance and furtherance of the race depend upon it, and whatever the continuance and development of the race has demanded has been realized. For Nature to say that a thing must be done is to say that it can be done. We are compelled only as we are enabled. In setting up a purpose to realize physical strength we are acting with, not against, the resistless and inexorable forces of Nature, that, working both within man and about him, have made him what he is.

If this truth could only be generally realized—that Nature's purpose for us is health, that the forces she would put at our disposal are absolutely dependable and only await our mastery—it would mean that an innumerable army of sick would rise and come forth; it would mean a new hold on life for the well; it would mean the physical regeneration of the world.

Such is the glory and the promise of the Physical Ideal. In such manner does the goal lift up its shining heights. Merely to look upon it, to become absorbed in the light of it, to turn toward it with a great purpose—is to bring it near. Indeed, only to become thoroughly saturated with the thought of health—its freedom, its vigor, its bounding joy—is sometimes at once to reclaim it; for with marvelous quickness and without conscious effort the body may respond and claim its own.

Whoever in this world helps to hold before mankind the ideal of physical perfection is by that deed a benefactor. It is in this way that the "divine healer" does good, the "magnetic healer" makes cures, the Christian Scientist gets results, the mental scientist and all his tribe help and heal. For they all, according to their light, with varying degrees of high intelligence or of childish ignorance, are holding before the people the thought of health. And health is as contagious as disease. Stripped of theological and other accessories in the hand of the Suggestionist, and scientifically applied, this same law works out its beneficence. Of whatever

name or character or degree of ability, these people are in some measure proving, first, that man has control of the same forces to build up his body that he has to build a ship or a house or a government; and, second, that the mental process in all is essentially identical.

The first thing, then, for the man who would be well, is with earnestness and strong desire to fix his heart and soul and utmost purpose upon *being* well. It is with supreme assumption to take command of his bodily forces until they are ready to obey his will. It is continually to be forgetting the things that are behind, and pressing toward the mark that is on ahead. It is to repudiate and ignore, and laugh in the dread faces of discouragement and despair. It is with confidence and boldness to lay hold of life.

III.

And this he is to do by putting his thought into action. He must show his faith by his works. To look to the goal is well, but to move toward it is better. Means are to be employed and activities put forth in order to make the ideal condition actual—at least so far as this process depends upon conscious effort. And this—as to what shall be done and how—is an ancient battlefield and a Babel of voices. The air resounds with contradictions, and the wise and the unwise speak their minds. But of this much the sick man may be sure—he needs, first of all, materials to rebuild his body. This is a fact curiously overlooked, and it accounts for a myriad of failures. We know that the architect needs not only a plan—an idea—but stone and brick and mortar. Yet we usually expect our own tissues to be repaired and all the great variety of bodily processes carried on, without adequate provision of material. Most people take enough food, a few people breathe enough air, but it is the rarely exceptional individual who drinks enough water. This is usually to be had in abundance—almost without money and without price—it is everywhere about—but we perish for the lack of it. The body must, in large proportion, be made of it, but we furnish it stintedly, because we are ignorant and careless, or because we are sure that "Mind" doesn't need anything so gross. Or we are afraid it is impure, and might poison us; so we generate in our systems the most deadly poisons for the need of it. The blood grows stagnant and thick, the liver demands something to make bile of, the stomach has to stop work for lack of gastric juice material, and the nervous system goes out on a sympathetic strike. We are fastidious *about* bathing, mayhap—we keep the

outside whited, but the inside is full of all uncleanliness, if not of dead men's bones. We take long journeys often, and we pay large sums to have our pulse examined and a tonic prescribed, when all we need is enough liquid to enable the body to get rid of its impurities and keep itself in working order. To the great majority of people it is yet a revelation that the average adult requires two full quarts of liquid per day. In the matter of breathing we are only a trifle less negligent than in our drinking. Everybody knows the need of the body for an abundance of fresh air, but practically we think little of it, and it is the exceptional house that is adequately ventilated. Likewise, it is the exceptional person—especially the exceptional woman—who breathes well. As to bathing and exercise, and host of other things, there is a wide latitude to meet individual needs and varying conditions; but whatever else the man in quest of sound health does or does not, his body absolutely requires nourishing food, and an abundance of air and water. No mental effort, no ambition, no theory, can take the place of the actual raw material needed. To stimulate within the sick man's mind the image and inspiration of health, and fail to supply him the material to build upon, is a farce—were it not so apt to be tragedy.

So much for the material means and activities for realizing the physical ideal. As to the mental means, the most fundamental has already been given—to hold the thought of health that is to be realized—to set up before the mind's eye the image of the self as freed from its limitation. That is to say, the second step in the process under discussion is much of the third; or, as already put, to look steadfastly upon the goal is to tend to bring it near. But to do this—and the other things necessary to be done—the mind must put its energies to work in the best way. And the best way is by systematic suggestion and auto-suggestion in some form or other.

In many cases of illness, it is true, the body seems to regain strength without especial mental effort; but these words are written for the sake of the one who would be well, no matter what the effort, and whether the body seem willing or not. And the one will find abundant reason to use his will power—not merely to move his muscles, but to control his feelings and direct his attention. If he would most speedily free himself from his limitations, he will wish to waste no particle of energy in fretfulness or petulance. Deadlier than any microbe that crawls, or flies, or swims, is grief. More debilitating than summer's heat, more

blasting than winter's cold, is a disappointment or a fear. More weakening than the hardest work is worry, apprehension, remorse, suspense. These feelings are only an incentive to some action, and are no more to be perpetually dwelt upon than bodily pain. When whatever has been done that can be done, the one who is achieving health in its fulness will resolutely blot them out of consciousness. If he is very much in earnest, he will be apt to determine that life is worth living, and that he will make it so for himself and other people; and he will set abloom within his soul the flowers of happiness and cheer and good-will, no matter to him how sterile that soil may seem. He will find himself desiring to cultivate not only a limitless energy, but to that end a limitless patience—with himself, and others, and the happenings of every day. Like Bunyan's immortal Pilgrim, he will fare on, his back upon the City of Destruction, his face toward the place of his desire. He may meet with Giant Despair and spend a time in Doubting Castle, he may wallow awhile in the Slough of Despond, and have many a stiff bout with Apollyon; but if he only keep on he will see the Shining Ones named Health and Strength come out to meet him. Is it worth the effort? Yes.

TOLSTOY'S ANSWER TO THE RIDDLE OF LIFE.

AN AMERICAN ADMIRER OF TOLSTOY.

ERNEST HOWARD CROSBY has been called Tolstoy's leading disciple in America, and truly no one has shown himself a more devoted friend to the venerable Russian reformer whose picture our author places before us in the following words:

"A strange figure—this peasant nobleman, this aristocrat, born into the ruling class of an autocracy, who condemns all government and caste, this veteran of two wars who proscribes all bloodshed, this keen sportsman turned vegetarian, this landlord who follows Henry George, this man of wealth who will have nothing to do with money, this famous novelist who thinks that he wasted his time in writing most of his novels, this rigid moralist, one of whose books at least, the "Kreutzer Sonata," was placed under the ban of the American Post Office. That same dramatic instinct which made him a great novelist, which impelled Sir Henry Irving to rank his two plays among the best of the past century, and which, as we have seen, has so often led him to find

lessons in the active world around him, this same instinct has ma of this least theatrical and most self-forgetful of men the drama prefigurement in his own person of a reunited race, set free by lc from the shackles of caste and violence. As it was with t prophets of old, so with him, there is a deeper significance in life, in the tragedy of himself, than in the burden of his spok message."

Mr. Crosby's enthusiasm for this prophet of peace and goc will on earth finds utterance in the following lines:

"Hail, Tolstoy, bold, archaic shape,
Rude pattern of the man to be,
From 'neath whose rugged traits escape
Hints of a manhood fair and free.

"I read a meaning in your face,
A message wafted from above,
Prophetic of an equal race
Fused into one of robust love.

"Like some quaint statue long concealed,
Deep buried in Mycenæ's mart,
Wherein we clearly see revealed
The promise of Hellenic art,

"So stand you; while aloof and proud,
The world that scribbles, prates, and frets
Seems but a simpering, futile crowd
Of Dresden china statuettes.

"Like John the Baptist, once more scan
The signs that mark the dawn of day.
Forerunner of the Perfect Man,
Make straight His path, prepare the way.

"The desert, too, is your abode,
Your garb and fare of little worth;
Thus ever has the Spirit showed
The coming reign of heaven on earth.

"Not in kings' houses may we greet
The prophets whom the world shall bless,
To lay my verses at your feet
I seek you in the wilderness."

And, indeed, Tolstoy is a remarkable man in spite of much that may be called one-sided and eccentric. Tolstoy, in his rugged originality and with his independence of thought, is and will remain forever a most unique personality. We will here let Tolstoy speak for himself, selecting from Mr. Crosby's books Tolstoy's solution of the problem of life, his view of the soul, and its destiny after death, which is Christian in spirit, explaining the argument of Tolstoy's belief in the doctrine of non-resistance, and at the same time closely resembles the Buddhist conception of Nirvâna.

TOLSTOY'S PHILOSOPHY.

"We should begin our researches with that which we alone know with certitude, and this is the 'I' within us. Life is what I feel in myself, and this life science cannot define. Nay, it is my idea of life rather which determines what I am to consider as science, and I learn all outside of myself solely by the extension of my knowledge of my own mind and body. We know from within that man lives only for his own happiness, and his aspiration toward it and his pursuit of it constitute his life. At first he is conscious of the life in himself alone, and hence he imagines that the good which he seeks must be his own individual good. His own life seems the real life, while he regards the life of others as a mere phantom. He soon finds out that other men take the same view of the world, and that the life in which he shares is composed of a vast number of individuals, each bent on securing its own welfare, and consequently doing all it can to thwart and destroy the others. He sees that in such a struggle it is almost hopeless for him to contend, for all mankind is against him. If, on the other hand, he succeeds by chance in carrying out his plans for happiness, he does not even then enjoy the prize as he anticipated. The older he grows, the rarer become the pleasures; ennui, satiety, trouble and suffering go on increasing; and before him lie old age, infirmity and death. He will go down to the grave, but the world will continue to live.

"The real life, then, is the life outside him, and his own life, which originally appeared to him the one thing of importance, is after all a deception. The good of the individual is an imposture, and if it could be obtained it would cease at death. The life of man as an individuality seeking his own good, in the midst of an infinite host of similar individualities engaged in bringing one another to naught, and being themselves annihilated in the end, is an evil and an absurdity. It cannot be the true life.

"Our quandary arises from looking upon our animal life as the real life. Our real life begins with the waking of our consciousness, at the moment when we perceive that life lived for self cannot produce happiness. We feel that there must be some other good. We make an effort to find it, but failing, we fall back into our old ways. These are the first throes of the birth of the veritable human life. This new life only becomes manifest when the man once for all renounces the welfare of his animal individuality as his aim in life. By so doing he fulfills the law of reason, the law which we all are sensible of within us—the same universal law which governs the nutrition and reproduction of beast and plant.

"Our real life is our willing submission to this law, and not, as science would have us hold, the involuntary subjection of our bodies to the laws of organic existence. Self-renunciation is as natural to man as it is for birds to use their wings instead of their feet; it is not a meritorious or heroic act; it is simply the necessary condition precedent of genuine human life. This new human life exhibits itself in our animal existence just as animal life does in matter. Matter is the instrument of animal life, not an obstacle to it; and so our animal life is the instrument of our higher human life and should conform to its behests.

"Life, then, is the activity of the animal individuality working in submission to the law of reason. Reason shows man that happiness cannot be obtained by a selfish life, and leaves only one outlet open for him, and that is Love. Love is the only legitimate manifestation of life. It is an activity which has for its object the good of others. When it makes its appearance, the meaningless strife of the animal life ceases.

"Real love is not the preference of certain persons whose presence gives one pleasure. This, which is ordinarily called love, is only a wild stock on which true love may be grafted, and true love does not become possible until man has given up the pursuit of his own welfare. Then at last all the juices of his life come to nourish the noble graft, while the trunk of the old tree, the animal individuality, pours into it its entire vigor. Love is the preference which we accord to other beings over ourselves. It is not a burst of passion, obscuring the reason, but on the contrary no other state of the soul is so rational and luminous, so calm and joyous; it is the natural condition of children and the wise.

"Active love is attainable only for him who does not place his happiness in his individual life, and who also gives free play to his feeling of good-will toward others. His well-being depends upon

love as that of a plant on light. He does not ask what he should do, but he gives himself up to that love which is within his reach. He who loves in this way alone possesses life. Such self-renunciation lifts him from animal existence in time and space into the regions of life. The limitations of time and space are incompatible with the idea of real life. To attain to it man must trust himself to his wings.

"Man's body changes; his states of consciousness are successive and differ from each other; what then is the 'I'? Any child can answer when he says, 'I like this; I don't like that.' The 'I' is that which likes—which loves. It is the exclusive relationship of a man's being with the world, that relation which he brings with him from beyond time and space. It is said that in his extreme old age, St. John the Apostle had the habit of repeating continually the words, 'Brethren, love one another.' His animal life was nearly gone, absorbed in a new being for which the flesh was already too narrow. For the man who measures his life by the growth of his relation of love with the world, the disappearance at death of the limitations of time and space is only the mark of a higher degree of light.

"My brother, who is dead, acts upon me now more strongly than he did in life; he even penetrates my being and lifts me up toward him. How can I say that he is dead? Men who have renounced their individual happiness never doubt their immortality. Christ knew that He would continue to live after His death because He had already entered into the true life which cannot cease. He lived even then in the rays of that other centre of life toward which He was advancing, and He saw them reflected on those who stood around Him. And this every man who renounces his own good beholds; he passes in this life into a new relation with the world for which there is no death; on one side he sees the new light, on the other he witnesses its actions on his fellows after being refracted through himself; and this experience gives him an immovable faith in the stability, immortality, and eternal growth of life. Faith in immortality cannot be received from another; you cannot convince yourself of it by argument. To have this faith you must have immortality; you must have established with the world in the present life the new relation of life, which the world is no longer wide enough to contain."—"The Open Court," December, 1903.

MEDICAL EXCERPT.

By T. P. CORBALLY, A.M., M.D.

THE CIRCULATION IN THE SECRETION OF URINE.—MM. Lamy and Mayer have made many experiments on the urinary circulation, and at a meeting of the Société de Biologie have given the following conclusions:

1. There is no invariable relation between the degree of the pressure and the activity of the secretion in the kidneys.

2. The general variation of pressure and that of the quantity of urine secreted do not take place necessarily in the same sense.

3. All the conditions being equal, the increase of the pressure renders the urinary secretion more active.

As to the rapidity with which the blood passes through the kidneys:

1. There is no constant relation between the rapidity of the circulation and activity of the secretion in the kidney.

2. The variations do not take place in the same sense.

3. All conditions being equal, the increase in the rapidity of the circulation favors the diuresis. This tends to establish the fact that the secretion is a very different thing from a filtration, and that the important rôle in the function of the kidneys belongs to the cells, which must not be considered as inert membranes.

These conclusions refer particularly to the mechanical conditions in the circulation in the urinary circulation ("Le Progrès Médical," December 5, 1903).

RADIOGRAPHIES OF THE TUBERCULAR GANGLIONS.—M. Bouchard presented, in the name of M. Béclère, radiographic proofs taken on the living subject ("Le Progrès Médical," Dec. 12, 1903), that reproduce with an extraordinary exactness all the lymphatic and ganglionary systems of the neck, the axilla and the thoracic cavity.

TUBERCULINES.—M. Marmoreck considers that the tubercle bacillus produces two kinds of toxines: one diffusible, drawing effects from a distance, especially on the nervous system; the other adherent to the bacillary body, acting by contact on the adjoining tissues by causing a defensive reaction which results in the formation of the tubercle.

Given this multiplicity of tubercular toxines, the indication seems to be to strengthen the resisting power of the organism, rather than try to neutralize them by antitoxines. The tubercular bacilli are fully enveloped in the phagocytes, but generally these latter are incapable of digesting them. The problem, then, which is presented is to increase the bacteriolytic power by means of a vaccine matter obtained during the actual development of the same disease. The vaccinating substances are found to exist in the medium in which is found the bacillus of Koch, and even in this bacillus itself. The following is the means the author has employed for the preparation of the vaccine:

To 600 cc. of bouillon of veal he adds 400 cc. of hydrate of lime freshly prepared; after filtration, sterilization, implanting, this bouillon is put in the stove at 37° to 38° during two months to two and a half; the substance having become acid, is filtered on paper, then neutralized by means of lime water, filtered on wax, and evaporated in a vacuum cold until it has a syrupy consistence. The toxines thus obtained are designated by the name of *basitoxines* (T. B.).

For the other part the tubercle bacillus, thoroughly washed and dried in vacuum, are treated with the water-bath for two hours at about 70° with a solution of orthophosphoric at 1 per cent. (in the proportion of 300 cc. of the solution for 7 gr. of the bacilli dry), by agitating it frequently; after cooling it is filtered several times on paper; to each centimeter cube of the filtered substance corresponding with 0.002 gr. of the substance extracted from the bacillary bodies. The author designates these last under the name of *acidotoxines* (A. T.).

He used in his experiments on man and on the guinea-pig a combination of equal parts of A. T. and T. B. previously diluted. In the case of the guinea-pig the vaccination so far shows no definite result, but the animals so treated are still alive and unchanged. In man these tuberculines during more than two years have been employed in 90 cases with or without fever. Although two-thirds of these tuberculous cases have arrived at the second or at the third period, in 60 of them an amelioration of all the morbid symptoms has been distinctly manifested.—PHISALIX.

LE SERUM DE MARMORECK.—MM. Dieulafoy, Le Dentir, Hallopeau, report to the Académie de Médecine many different observations on patients treated with the new antitubercular serum ("Le Progrès Médical," Dec. 12, 1903). The results have been moder-

ate; they were even bad in seven cutaneous cases of tuber
treated by M. Hallopeau. M. Monod has been more succes
in many cases of localized tubercles. All the patients were
proved some; some may be considered cured. But in these c
the effect of general hygiene and of surgical interference, wh
have not been neglected, must be taken into consideration.

No accident, either local or general, has in any of the cases be
observed.

WOUND OF THE LIVER AND THE RIGHT FEMORAL ARTERY.—M. Leguen presented to the Société de Chirurgie a patient
whom he operated immediately after the accident one evening for
wound in the liver caused by a ball from a revolver ("Le Progr
Médical," Dec. 5, 1903). The wound was vertical and deep, an
M. Leguen could not do more then than tampon it. Some tim
afterward the patient, who was in the service of M. Blum
wished to know where the ball was located. On the application
of the radiograph it was discovered that the projectile was located
in the triangle of Scarpa.

M. Blum wished to extract it by means of a small incision, after
giving a local anesthetic with cocaine. The ball was easily re-
moved, but the moment the pressure caused by the ball was taken
away, and the clots taken out, a dangerous hemorrhage followed
which it was impossible to arrest, except by a ligature on the
femoral artery. The artery had been wounded by the ball when the
accident occurred.

SUPPURATING APPENDICITIS OPENING INTO THE BLADDER.—Dr. Enrique Fortuna, of Havana, reports ("Revista Medica Cubana," July, 1903) a complicated case of suppurating appendicitis
with evacuation into the bladder (the urine which was shown to
us was extremely fetid and mingled, and it contained a large
quantity of pus) and syphilitic cirrhosis of the liver.

"We advised the patient to consent to be operated upon, which
he did. On the following day an incision of about 7 centimetres
was made into the middle of the depression observed in the iliac
pit. We rapidly reached a perfectly defined cavity, which con
tained a little pus mixed with mucosities. We washed out the
cavity with Hydrozone and plugged it with iodoform gauze. On
the following day, when we dressed the wound, upon careful ex
amination of the cavity, we did not find any connection with the
bladder, but we could extract the appendix, which was affected by
fæces.

A complete cure was accomplished in a month, and during that the liver decreased considerably in volume. Since the third of the operation antisyphilitic treatment was followed. The communication between the cavity of the abscess and the dder healed after 12 days of treatment."

COLLARGOLUM BY INTRAVENOUS INJECTION IN ERYSIPELAS.—arren Coleman, M.D., Professor of Clinical Medicine, Cornell niversity, reports ("Medical Record," Nov. 21, 1903) the deils of the successful use of collargolum in five cases of erysipas. Three of them promptly recovered after single injections, he of them after two injections, and the last after three injecons. Being convinced by an experience of some 20 cases of ar us diseases of its harmlessness, he recommends that the ethod be tried in appropriate cases. So impressed is he with the ossibilities which the intravenous use of collargolum holds that he s activ continuing the work upon cases placed at his disposal y Prof. . Loomis.

THE TREATMENT OF NASAL CATARRH.—Mannon ("Cincinati Lancet-Clinic") finds no danger whatever from the use of the asal douche, provided ordinary care is taken and a proper solution s employed. charge that post-nasal douching is prone to xcite inflammation of the middle ear, he does not find sustained. All leading specialists employ this method of treatment in the posrior as well as the anterior nares with equally good results. The loctor has had chronic nasal catarrh of many months' duration ield to douching when heroically employed. Listerine to which a small quantity of bicarbonate of soda has been added is his main stand-by. If hemorrhage is a controlling feature he uses instead a saturated solution of tannic acid, to each ounce of which ten grains of carbolic acid has been added. When the tendency to bleed ceases he returns to the listerine solution. Treated in this way the most pronounced cases yield in three or four weeks and are not prolonged by complications or sequelæ.

REMITTENT FEVER OF INDIA CAUSED BY A NEW PIROPLASME.—MM. A. Laveran and F. Mesmil have recently described to the Academie des Sciences as a new piroplasme, under the name *Piroplasma Donovani,* a parasite found in the blood of the spleen of patients suffering with a special remittent unaffected by quinine ("Le Progrès Médical," Dec. 19, 1903). This affection seems to extend its influence over a great part of India, for it has been

described by M. Leishman near Calcutta, and by M. Donovan a Madras.

The parasite was first observed by M. Leishman, who made c it a trypanosome having undergone changes in the cadaver. M Renauld Ross considers it as a new sporozoaire, for which he ha formed the generic term Leishmania. The authors, relying on th new preparations that have been sent to them by M. Donova who has observed not less than 16 cases of the fever in questic from the 17th of June to the 5th of November last, still maintai their former opinion, and see in this micro-organism the first pir plasme parasite in man.

This protozoaire, in the preparations obtained from the splee and the liver, is found under the appearance of small pyrofor bodies, oval or spherical, from 2.5m. to 4m. long, and 1.5m. wid free or included in the blood globules and the leucocytes. The are reproduced most frequently by bi-partition and longitudin division of the cell, or by manifold divisions. In this last ca their volume increases, then their nodule divides twice, and eve three times, and in this way they include four, and at times eigh kernels.

The parasitic blood vesicles increase in volume in proportion t the number of piroplasmes (from 1 to 7 or 8) that they contain they change very rapidly, become pale and of bad color. The pre ence of these endoglobular forms justifies the supposition tha the parasite ought at some time be found in the peripheral circula tion, but M. Donovan has never found it there, and MM. Lavera and Mesnil have not found it in the preparations of blood tha this practitioner has sent to them.

Attributing to this micro-organism the genera piroplasme re sults according to the authors from its numerous analogies with th *Piroplasma bigeminum*, the agent of the epizootic fever of Texa and prototype of the group so remarkable for its pear shape an endoglobular elements, and also from its habitual manner of repro duction by a longitudinal division in two equal parts.—Dr. Phi SALIX.

UROTROPIN IN THE PROPHYLAXIS OF SCARLATINAL NEPHRITI —Dr. J. Widowitz, Gratz, Austria, reports ("Wiener Klinisch Wochenschrift," Oct. 1, 1903) the beneficial action of urotropi in vesical catarrh, pyelitis and phosphaturia, and ascribes its benef to the disinfectant action of the formalin separated from it in th urinary passages, by which he was induced to use urotropin i

scarlatina to prevent the advent of nephritis. For, he says, it is probably correctly assumed that nephritis in scarlatina is due to the as yet undetermined scarlatinal microbe or its toxines; and an efficient antibacterial agent applied to the site of the infection may inhibit the pathological changes that mark the renal affection.

During the past three years he used it in 102 cases. From three-quarters to seven and a half grains were given thrice daily for three consecutive days at the onset of the disease; and the same doses were given at the beginning of the third week, when nephritis most commonly occurs. Children from 1 to 15, and an adult of 21, were treated in this way. The remedy was always well borne. Nephritis did not occur in a single case, although it is the most common complication of scarlatina. Johannessen has seen it in as few as 16 per cent. and as many as 90 per cent. of the patients. It occurs especially in mild cases, which were the most frequent.

Two cases deserve especial mention. A girl of 11 sickened with a fairly mild attack. On the 15th day large quantities of albumin were present in the urine. Five grains urotropin t. i. d. Two days later the albumin permanently disappeared. Another girl of 11 had had paroxysmal hemoglobinuria for 8 years. When she fell sick with scarlatina hemoglobinuria at once appeared. Urotropin 5 gr. t. i. d. Urine free from blood coloring matter on the third day. On the 14th day temperature rose to 100.6° and hemoglobinuria reappeared. On the 18th day urotropin was again given; blood coloring matter disappearing 4 days later.

The absence of nephritis in his 102 cases, he says, may possibly have been accidental. But it certainly urges to further clinical trials.

RECENT SANITARY PATENTS.

741625.—Strength Testing or Punching Machines; Robert J. Carson, New York, N. Y.

741679.—Means for Excluding Dampness from Vaults; Herman L. Kubbernuss, St. Louis, Mo.

741690.—Water Purifier; Oscar M. R. Moller, Copenhagen, Denmark.

741722.—Tooth Brush; Wm. B. Ryder and Chas. L. Reynolds, Redding, Cal.

741742.—Sterilizing Apparatus; Georg Van Eyck, Oeflingen, Germany.

741855.—Refrigerating and Purifying Apparatus; Carl W Vollmann, Montreal, Canada.

741966.—Exercising Device; Chas. Hernsheim, New York N. Y.

741988.—Holder for Toilet Paper; John J. Tierney, New York N. Y.

742224.—Process of Treating Garbage; Ernest S. Peck, Newburg, Ohio.

742225.—Process of Treating Garbage; Ernest S. Peck, Newburg, Ohio.

742226.—Process of Treating Garbage; Ernest S. Peck, Newburg, Ohio.

742287.—Massage Instrument; Louis Casper, Chicago, Ill.

742393.—Exercising Device; Wm. H. Chellis and Frank W McAnanny, Racine, Wis.

742534.—Massage Implement; Julius B. Wantz, Chicago, I

742560.—Sterilizer; Robt. B. Barnstead, Ashmont, Mass.

742838.—Means for Fumigating; Lewis W. Cock, San Marco Tex.

742900.—Sanitary Delivery and Display Package; Wm. J Page, Dixon, Ill.

742934.—Water Purifying Apparatus; Jas. Anderson, Brooklyn, N. Y.

742994.—Sanitary Trap; John W. McAuliffe, Providence, R.

743127.—Disinfecting Apparatus; Franklyn M. Wise, New York, N. Y.

743226.—Spittoon; Friedrich K. Beyer, Bielefeld, Germany and Conrad W. W. T. List, Hanover, Germany.

743310.—Neck and Chest Protector; Stillman A. Moulton Campbell, Cal.

743340.—Disinfecting Apparatus; Percy Simundt, Charlottenburg, near Berlin, Germany.

743353.—Device for Disinfecting Telephones; Nelson J. Tubbs Louisville, Ky.

743528.—Apparatus for Flushing and Ventilating Urinals; Jos Le Reandit L'Henreux, Windsor, Canada.

743562.—Device for Cooling or Warming the Human Body Bernhard Röber, Dresden, Germany.

744171.—Method of Separating Oily or Similar Impurities from Water; Henry T. Davis and Ernest Perrett, Lewisham, England.

744193.—Apparatus for the Purification of Water; Frank S *Hammond*, Malden, Mass.

EDITOR'S TABLE.

SANITARIAN, FEBRUARY, 1904.

All Communications, business and otherwise, all exchanges and all publications for review should be addressed to the Editor, Dr. A. N. Bell, 337 Clinton Street, Brooklyn, N. Y.

CORRIGENDA:

THE INTERNATIONAL CONGRESS ON TUBERCULOSIS.

Dr. *S. A. Knopf,* of New York, not "Knapp" as the printer made us say in our January issue, who has such an antipathy to Mr. Clark Bell that he would sooner have no Congress with a view to concentrated action for the prevention of tuberculosis, than one with which Mr. Bell is identified. This opposition of Dr. Knopf is the more remarkable since, besides his having assumed oracular authority in behalf of the medical profession, through a half dozen or more medical journals, defining the qualifications of the personnel which he deems essential for such an organization, he has presented an urgent "Plea for Justice to the Consumptive" ("Medical Record," January 2) to an audience of *jurists* and physicians, embodying the need of just such co-operation of physicians and men of other professions and affairs as provided in the International Congress. He severely and deservedly berates the Governor and Legislature of New York for their opposition to the will of the medical profession in the choice of suitable sites for sanatoria. But anxious, as he always appears to be, to identify himself with every movement for the treatment and prevention of tuberculosis he hears of, he schemes and attempts to debase the forthcoming International Congress because Mr. Clark Bell has been a leading spirit in its organization.

Early in November last he wrote to Dr. E. J. Barrick, president of the Congress:

"I have learned that there is to be an American Congress on Tuberculosis, of which you are the president. I am anxious to be informed as to when and where the Congress is to be held, and who is the secretary, and what formalities have to be complied with in order to become a member?

"Thanking you in advance for your kindness, I am,

"Very sincerely yours, S. A. KNOPF."

"P.S.—If there is any printed matter (circulars, etc.) issued, will you kindly favor me with such?"

"(Dictated.)"

In reply, Dr. Barrick referred him to Mr. Clark Bell, Chairman of the Committee of Arrangements, who could tell him all about it. That was enough. From the time he received the reply to this, he seems to have worked unceasingly to debase and supplant it. He has been successful in so far as to have been chiefly instrumental in calling a review congress, at the "Tuberculosis Exposition" to be held in Baltimore, beginning January 25, to know what he and his followers can do about it.

We are gratified to know that, notwithstanding Dr. Knopf's energetic opposition—perhaps, in part, because of it—the prospect of a great congress, comprehending persons of the highest distinction, interested in measures for the prevention of tuberculosis, is eminently encouraging. The "*Congress Internationale* de la Tuberculosis," which was announced to be held in Paris September 26th to October 1st, 1904, under the presidency of Professor Brouardel, one of the Honorary Members of the Medico-Legal Society, and of whom Prof. Dr. M. Letulle, of the Faculty of Medicine, 7 Rue de Magdebourg, is Secretary, out of respect to the American Congress, has decided to postpone its session to the year 1905. Prof. Brouardel had been advised of the action of the United States Government respecting the holding of the American Congress at the St. Louis Exposition, at dates, which, while although not identical, were too near each other to enable the Frenchmen to attend the St. Louis Congress or the Americans to attend the Paris Congress.

The adjournment will accommodate both bodies and enable the International Congress at St. Louis to receive the representatives of the Paris Congress who have been invited to be present.

There has been for many years a great desire to meet Prof. Brouardel on this side of the Atlantic, and it is reasonably hoped that he will attend the International Congress at St. Louis, on October 3d, 4th and 5th, 1904.

THE CARNEGIE INSTITUTION.

The Carnegie Institution at Washington is undoubtedly the chief benediction of Mr. Andrew Carnegie. His gift of $10,000,000 constitutes an endowment of research. It is not an institution for teaching, but an institution for inquiry, for exploration and discovery in the arts, the sciences, and in those branches of investigation which add to the stock of human knowledge. Funds are liberally provided from the sums annually devoted to such purposes for research in any field or upon any subject as to which

there is a reasonable promise of human enlightenment, and in respect to which enlightenment would be useful or desirable. There is nowhere else in the world so important a source of scientific inquiry.

The Institution has resources amounting to $10,101,500. During the past year it has defrayed the expenses of ethnological investigations among the Pawnee Indians, of inquiries into the evidence of the antiquity of man in America, into the geological conditions in the trans-Caspian region and in Eastern China, into the problem of resistance and propulsion in navigation, into the physiology of nutrition, and among the subjects of study have been marine biology and embryology, which was studied in the experimental station at Naples; besides many subjects in the domain of astronomy and chemistry. Archæological investigations have been carried on in Greece and Asia Minor, and an investigation has been begun with a view to determining the most favorable point in the southern hemisphere for the establishment of an astronomical observatory. Studies of the sun and the moon are proposed, and historical research is mentioned among the objects encouraged by the Institution.

The expenses of administration are relatively small, leaving its great revenues applicable to the main purpose of the foundation. For the present year there is appropriated $60,000 for administration, $130,000 for "larger projects," $300,000 for minor projects of research, and $43,000 for special grants, besides $100,000 for a reserve fund, presumably as a provision for unforeseen objects which may from time to time be presented as worthy.

AN UNSINKABLE SHIP.

Captain Diedrich Hogemann and First Engineer Schriever, of the North German Lloyd steamer Kaiser Wilhelm II, gave a demonstration recently while the ship was in this port of the new system by which the gigantic liner is made practically "unsinkable." It takes only twenty seconds to put in motion the machinery which, acting with absolute accuracy, makes the vessel invulnerable to the dangers of collision.

The double bottom of the ship is divided into twenty-six watertight compartments, and the hull has sixteen transverse bulkheads reaching to the deck and one longitudinal bulkhead separating the engine rooms. It is for the operation of the doors of these bulkheads below the water line that the device has been invented, hydraulic pressure being the motive power used.

The first movement on the bridge not alone releases the controlling device, but sounds warning gongs in all of the machine and bunker rooms, so that those employed there may spring at once to their posts and be prepared for any emergency, or for escape to the deck if it becomes necessary. Almost immediately the great half-ton steel doors, with absolute precision, descend, cleaving their way through anything that may be in the way. In the tests four and five feet of coal have been cut through by the sharp edges of the doors. In this way the ship is divided into numerous sections, all of them water-tight, and the designing of the boat has been so done that should two adjoining bulkheads become flooded, the vessel would still float.

Besides the automatic device, there are means of closing each bulkhead door from the deck, and an electrical device causes a red light to glow in the chart room, so that the captain may know instantly just what bulkheads are closed and which are opened.

The pumps in the engine room, as well as the pressure tanks and the supply tanks, are so placed as to be above the inflow of water from any injury to the hull. Altogether, the Kaiser Wilhelm II, which is regarded as the costliest and largest passenger steamer in the world, having a capacity for the transportation of two thousand five hundred persons, is about as "unsinkable" as a boat can well be.—"Mail and Express."

TENEMENT-HOUSE ENLARGEMENTS IN BOSTON.

A serious problem ("American Architect") confronts the people of Boston, in the apparent necessity for remodeling the portions of the building laws relating to the construction of tenement-houses. Under the present law, every new tenement-house more than three stories in height must be of fireproof construction throughout. This regulation has, naturally, checked the building of tenements in the older part of the city, where land is too valuable to be covered with three-story structures, and not valuable enough to warrant the erection of four or five story fireproof buildings, and has driven tenement-house construction to the newer portions of the city, where immense tracts, which were well on the way toward becoming beautiful and desirable residential quarters, have been irretrievably ruined by the invasion of miserable three-story flats, of the cheapest possible construction. Many attempts have been made to secure the modification of the law, so as to permit the erection of non-fireproof tenements to a height of four stories, which, except in the most crowded quarters, is the limit to which

it is prudent to carry such houses without putting in a passenger elevator; but the insurance companies have steadily resisted such change, and their influence is too strong to be overcome. Now, a new problem has presented itself, in the question of utilizing the houses, built fifty or sixty years ago, at the South and West Ends. These houses were once the dwellings of the rich, but the change of fashion, or, rather, the invasion of the territory by the foreign element which is so large in Boston, has driven out the original inhabitants, and the houses are rented to such tenants as offer themselves. Many of the houses are large, and could be altered into excellent tenements, but the law, which forbids any such alteration of a four-story building, unless it is made fireproof throughout, stands in the way of this, and, in consequence, most of the houses are utilized for lodgings, to the disadvantage of the owner, who could get a better rent for them as tenements, and not much to the advantage of the lodgers. The new Tenement-house Commission of Boston intends, it is said, to take up this matter, not in the interest of the landlords, but in that of poor families, who are seriously inconvenienced by having to go two or three miles away from their work to find cheap tenements, and could, except for the law, be conveniently, cheaply and safely accommodated in the heart of the city.

STREET DIRT IN EDINBURGH AND LONDON.

In Edinburgh ("The Surveyor," November 13,) very primitive methods for the collection of house refuse exist. The housewives, instead of placing the day's collection in closed barrels, to wait the advent of the dustcart, empty it pell-mell on the streets, with dire results to pedestrians when the wind is high. The corporation is endeavoring to introduce a more up-to-date method, and the other day Sheriff Rutherfurd reserved his judgment as to the confirmation of the proposed regulations. Over 1,000 rate-payers have petitioned in favor of the old order of things remaining.

Referring to the above statement, the following letter addressed to the editor of "The Daily Mail" (London) is one more illustration of the advantages of seeing ourselves as others see us:

"The methods of dust-collecting in Edinburgh, compared with those of London, are exemplary.

"Every household is obliged to have its refuse placed in a bucket outside the door before 6.30 a. m., and it is then collected by carts directly afterward. Sheriff Rutherfurd, in the case referred to in your issue of November 5th, said he did not know any town which

had a more lavish system in this respect. Sir Henry Littlejohn the Medical Officer of Health in Edinburgh, has been for years engaged in perfecting satisfactory hygienic arrangements in the matter.

"In London I have stood on a doorstep in Carleton House terrace at 2 p. m., going to lunch, and had my lungs filled with dust and refuse blown from carts into which receptacles were being emptied. It is only in the main thoroughfares that daily dust collecting before 10 a. m. is compulsory; in by-streets—and Carlton House-terrace is a 'by-street'—once a week is considered sufficient for removal, and that at any hour agreeable to the dustman, while bribes to effect even this satisfactorily are officially winked at."

THE SANITATION OF INDIA.

An elaborate report on the sanitation of India in 1901 has been issued. The population amounted to 293,000,000, showing an increase of 1.3 per cent. on 1891, but in several districts there was a considerable decrease. A marked relation was found between decreased population and diminished rainfall. The decennium included two famine years and cholera and plague were exceptionally prevalent. The decennial birth rates and death rates showed great variations; the highest provincial birth rate was 50.5, the lowest 14.67; the highest death rate was 119.9, the lowest 15.9 Cholera caused 4,500,000 deaths during the decennium. In 1901 the birth rate for the whole of India was 34.7, against 36.6 in 1900. The fever mortality was low, being 18.7, against 22.8 in 1900. The cholera death rate was low, 1.20, against 3.70 in 1900 The smallpox death rate was 0.40. It is estimated that about 3% per cent. of the children born are vaccinated. There was a large increase of plague mortality, the deaths amounting to 283,988 against 92,807 in 1900.—London Letter "Journal American Medical Association," Nov. 7, 1903.

NEW VOCATION FOR WOMEN.—The German press reports that a new vocation has been found for women on account of the use of Roentgen rays (X-rays) in the hospitals. Courses of lectures for the instruction of X-ray nurses will soon be commenced at Berlin. These women will only serve as nurses of patients treated by X-rays and as assistants at the use of them, which service is of a very delicate nature and requiring great care.—Richard Guenther, Consul-General, Frankfort, Germany, Sept. 11, 1903.

DANGER IN CELLULOID DOLL HEADS.—A Leipzig trade paper in reporting on the recent fair held in that city, speaks favorably

of a new line of doll heads, made of tin and covered with celluloid. The opinion is expressed in the paper quoted that this novelty is a desirable improvement, as many lines of doll heads now in the market are composed of celluloid and are of great danger to children, on account of the liability to explosion to which celluloid is subject. The paper says the use of celluloid in the manufacture of toys is making steady progress.—Simon W. Hanauer, Deputy Consul-General, Frankfort, Germany, Sept. 10, 1903.

PLAGUE PREVENTION BY VACCINATION.—As the plague has again made its appearance at European ports, interest in remedies for and preventatives of the scourge is naturally very keen. Preventive inoculation, or vaccination, is considered of first importance. The "Medical Record" draws a comparison between the present situation at Hong Kong and Manila with reference to the value of preventive inoculation. In both cities the plague exists, and at both many intelligent efforts have been made to suppress it, but not with the same results. At Manila the plague has subsided very materially and will probably soon disappear, but it seems that it cannot be suppressed at Hong Kong. The reason for this can only be found in the fact that Manila preventive vaccination has been compulsory and on a large scale, including the 60,000 Chinese residents. It has been proven that the vaccination in use there, if repeated in intervals of ten days, is as certainly effective as vaccination against smallpox. —Richard Guenther, Consul-General, Frankfort, Germany, Sept. 18, 1903.

SALICYLIC ACID HARMFUL.

Washington, Jan. 3.—The food test at the Department of Agriculture, which has been going on for several months past, to test the effect of salicylic acid on human health, has brought out some queer results. The general fact is established that salicylic acid seriously injures health. One man, however, has reason to rejoice in the salicylic acid treatment. It has cured his rheumatism.

The experiments have been abandoned to save the subjects, but will be resumed when the men have recovered somewhat from the effects of the past two months' diet on prepared foods into which salicylic acid enters as a preservative.

Dr. Wylie says that he expected this result. This experiment has turned out just as did that with foods preserved with borax. That made the men all sick.

THE VIRGINIA HOT SPRINGS.—Invalids who resort hither are to be congratulated on the acquisition of Dr. Guy Hinsdale, of

Philadelphia, as medical advisor. The virtues of the waters are well known. The climate is exhilarating and well suited to convalescents from almost every disease. But an accomplished medical advisor is none the less essential to this, as to all such health resorts.

MORTALITY AND MORBIDITY REPORTS AND REVIEWS.

STATE OF NEW YORK.—Monthly Bulletin Department of Health for November, 1903, 7,614,281: Total number of deaths, 10,009; annual death rate, 16.0; deaths under 5 years, 2,157; percentage of deaths under 5 years to total deaths, 21.7; deaths at 70 years and over, 1,714; deaths from zymotic diseases per 1,000 deaths from all causes, 100; from cerebrospinal meningitis, 23; typhoid fever, 165; malarial diseases, 9; smallpox, 3; scarlet fever, 61; measles, 48; erysipelas, 17; whooping-cough, 37; croup and diphtheria, 323; diarrheal diseases, 288; acute respiratory diseases, 1,573; consumption, 1,076; puerperal diseases, 91; diseases of the digestive system (not acute diarrhea), 566; diseases of the urinary system, 864; diseases of the circulatory system, 1,124; diseases of the nervous system, 1,056; cancer, 415; accidents and violence, 672; old age, 381; not classified, 1,274.

Smallpox is increasingly prevalent. By weekly bulletin issued by the State Department of Health, January 16, it had been reported during the previous week in the following places; Villages of Salamanca and West Salamanca, Cattaraugus County; city of Plattsburgh, Clinton County; village of Middleport and town of Cambria, Niagara County; and town of Massena, St. Lawrence County.

New York City, 3,732,903. Total number of deaths, 5,368; annual death rate, 17.15: Borough of Manhattan, 1,917,676—Deaths, 2,883; death rate, 18.3; Borough of the Bronx, 268,341, deaths 365; 16.4; Borough of Brooklyn, 1,219,597, deaths 1,790; 16.3; Borough of Queens, 182,681, deaths 229; 15.0; Borough of Richmond, 72,608, deaths 101; 17.0. The estimated total deaths from all causes in the greater city for the year 1903, as estimated by Dr. Guilfoy, Registrar of Records, was about 67,000. The death rate for the year 1902, the lowest recorded up to that time, was 18.75. The union of all the boroughs into the greater city tended to lower the average of the death rate, because the rate is

always slightly higher in Manhattan and the Bronx than it is in the outlying boroughs.

Though it cannot be assumed that the lowering of the death rate of the city within the two years past was wholly due to the efficiency of the Board of Health, considering the new measures practiced with regard to the schools and the more rigid enforcement of the anti-spitting law, there can be no question that the reduction was chiefly due to the efficiency of the service, however much it may have been favored by the no less efficient service of the Street Cleaning Department and the unusually cool summers.

THE NEW HEALTH COMMISSIONER.

Dr. THOMAS DARLINGTON is an eminently worthy appointee by Mayor McClellan as successor to Dr. Lederle. Dr. Darlington was born in Brooklyn forty-five years ago. Graduated at the College of Physicians and Surgeons (Columbia University), 1880. But before he took up the study of medicine, took a special three years' scientific and engineering course at the University of the City of New York. He practised medicine at Newark, N. J., 1880-82; subsequently at Kingsbridge, New York City, until 1888; at Bisbee, Arizona Territory, until 1891, when he returned to Kingsbridge, where he has practised ever since.

He was district physician of the Seventh District, Newark, 1882; visiting assistant at St. Michael's Hospital, Newark, 1880-82; surgeon to the New Croton Aqueduct Corporation, New York, 1885-88; to the Harlem Canal Improvement Works, 1888; surgeon

to the Copper Queen Consolidated, and other mining companies, and to the Arizona and Southeastern Railway, Arizona, 1888-91.

He is one of the vice-presidents of the American Climatological Association, of which he has been a member for a dozen years, and has stood deservedly high in its councils. He was president of the Medical Board of the New York Foundling Hospital for two years and is its visiting physician, as also of the Fordham Hospital, the St. John's Riverside Hospital, the Seton Hospital for Consumptives, and consulting physician to the French Hospital.

Considering the continuance of John McGaw Woodbury, Commissioner of Street Cleaning; and Dr. A. H. Doty, Health Officer of the Port, and General William McAdoo, Commissioner of Police, ex-officio members, the Department of Health continues to be exceptionally well equipped.

CALIFORNIA.—Los Angeles, 135,000. Health report for December: Deaths, 288—48 under 5 years; death rate, 18.02. From specific infectious diseases, 96; tuberculosis, 68—"19 had lived here less than three months, 1 between two, three and six months, 3 between six and twelve months, 23 between one and five years, 6 between five and ten years, 14 over ten years, unknown 1."

COLORADO.—Denver, 175,000. Report for October: Deaths, 211; premature and still births, 12. Death rate, per annum, 14.46. Deaths from phthisis, 48—47 contracted elsewhere; typhoid fever, 127 cases, 14 deaths; smallpox, 18 cases; chickenpox, 4 cases; diphtheria, 40 cases, 4 deaths; scarlet fever, 32 cases; measles, 20 cases; erysipelas, 9, 2 deaths. Deaths from heart diseases, 9; pneumonia, 10; bronchitis, 4; nephritis, 15; cancer, 5.

CONNECTICUT.—Bulletin for November: Deaths, 1,167; 43 more than in October, and 84 more than in November of last year, and 109 more than the average number of deaths in November for the five years preceding. The death rate was 15.1 for the large towns; for the small towns, 14.2; for the whole State, 14.9. Deaths reported from infectious diseases, including diarrhea, 236—20.2 per cent. of the total mortality.

Cases of infectious diseases reported: Smallpox, Windsor Locks, 1; measles, 643 cases in 41 towns; scarlet fever, 132 in 40 towns; diphtheria and croup, 182 in 45 towns; whooping-cough, 864 in 15 towns; typhoid fever, 79 in 33 towns; consumption, 29 in 13 towns.

DISTRICT OF COLUMBIA, 295,103—90,353 colored. Report for *the week* ended January 9: Deaths, 148—38 under 5 years. Death

rates, 19.6 for the whites, 39.2 for the colored, and 25.6 for the entire population. The prevailing causes of death were: pneumonia, 22; consumption, 17; diseases of the kidneys, 16; and apoplexy, 10.

Cases of typhoid fever continue to diminish. At the close of the week there were 73 cases; 4 new cases were reported and 30 were discharged, which leaves 47 under treatment. Scarlet fever has increased from 38 cases last week to 42 now under treatment.

ILLINOIS.—State of Chicago's health for the year 1903: Month of December.—Including the 587 theatre-fire deaths, accounted for by the Coroner's office and the Police Department, but not yet reported at the close of the year to the Bureau of Vital Statistics of the Department, the total deaths for 1903 will number 28,940, instead of the 28,353 given in the appended statement of mortality for the year. This will increase the death rate from 15.04 to 15.35 per thousand of population. Deaths from violence were already more than 12 per cent. in excess of the average for the period since the census year 1900; but these 587 theatre deaths swell the excess to 41.5 per cent. over the yearly average of violent deaths.

Even with this addition to the total mortality the death rate is 6 per cent. lower than the yearly average since 1892, although it is 8.2 per cent. higher than that of 1901 and 5.3 per cent. higher than that of 1902.

Statement of mortality for the year 1903, compared with the preceding years, 1902, 1901. Populations: 1903, 1,885,000; 1902, 1,820,000; 1901, 1,758,000:

	1903.	1902.	1901.
Total deaths, all causes	28,353	26,455	24,406
Annual death rate per 1,000	15.04	14.53	13.88
By sexes—			
Males	16,253	14,927	13,468
Females	12,100	11,528	10,938
By ages—			
Under 1 year	4,909	5,144	5,044
Between 1 and 5 years	2,962	2,883	2,445
Over 60 years	5,316	4,917	4,883
Principal causes of death—			
Acute intestinal diseases	2,221	2,243	2,219
Apoplexy	636	604	593
Bright's disease	1,714	1,427	1,127
Bronchitis	1,005	978	866

Consumption	2,968	2,556
Cancer	1,059	1,074
Convulsions	619	651
Diphtheria	614	596
Heart diseases	2,091	2,098
Influenza	166	118
Measles	276	123
Nervous diseases	1,483	1,425
Pneumonia	4,630	3,433
Scarlet fever	297	445
Smallpox	47	5
Suicide	492	439
Typhoid fever	588	801
Violence (other than suicide)	1,492	1,441
Whooping cough	270	266

Statement of mortality for the month of December, 1903, pared with the preceding month and with the corresponding n of 1902. Death rates computed on estimated figures of mid populations of 1,885,000 for 1903, and of 1,820,000 for 1902:

	Dec., 1903	Nov., 1903.
Total deaths, all causes	2,354	2,124
Annual death rate per 1,000	14.69	13.71
By sexes—		
Males	1,347	1,172
Females	1,007	951
By ages—		
Under 1 year	400	335
Between 1 and 5 years	214	180
Over 60 years	539	448
Principal causes of death—		
Acute intestinal diseases	81	96
Apoplexy	62	60
Bright's disease	166	148
Bronchitis	101	64
Consumption	228	192
Cancer	82	85
Convulsions	67	47
Diphtheria	59	80
Heart diseases	191	180
Influenza	13	2

Measles	7	3	15
Nervous diseases	120	120	128
Pneumonia	498	333	417
Scarlet fever	17	16	26
Suicide	42	40	36
Typhoid fever	36	56	132
Violence (other than suicide)	124	125	144
Whooping cough	5	6	34
Smallpox	—	—	4

THE IROQUOIS THEATRE FIRE.

This terrible calamity of nearly six hundred deaths would not have occurred if the managers of that theatre had been required, as all theatre managers should be, to be familiar with knowledge of the causes and the means for preventing such disasters. William Paul Gerhard, C. E., wrote a little book on the subject (published by John Wiley & Sons, New York) a few years ago, of special significance in this regard. With reference to this most recent calamity ("Scientific American Supplement") he well says:

"The long list of theatres destroyed by fires breaking out during a performance and the numerous instances of fire breaking out during these hours, but which are put out before spreading, are proof sufficient that the dangers spoken of are constantly threatening the theatre-going public. . . .

"The lives of people in theatres, on the occurrence of fire, whether spectators, actors, musicians, chorus singers, ballet girls or stage hands, are endangered:

"1. By smoke, fire gases, heat, asphyxia, exhaustion.

"2. By fire burns.

"3. By jams, knocking over, falling down stairs, trampling, crush.

"4. By direct shock or fright.

"5. By accidents, such as falling of the central chandelier.

"If only plenty of exits are provided, so that, under all circumstances, the whole audience, even when frightened and suddenly thrown into a state of high mental excitement, can leave the building inside of two or three minutes, the fire-resisting qualities of the building are of less consequence, as regards the safety of the persons in the theatre. In fact, a theatre inferior in point of construction, but having exits as above described, would be safer than one built thoroughly fireproof, but otherwise not well arranged and not provided with sufficient stairs and exits, and where, there-

fore, in case of a false or real alarm of fire, or a panic from any cause, the people would be necessarily in grave peril."

INDIANA.—Statistics of the State Board of Health for November show that bronchitis was the most prevalent disease and tonsillitis the next. Pneumonia was more prevalent than in the same month last year, the deaths being 241 and 181, respectively. The total number of deaths reported was 2,518, an annual rate of 12.2. In the corresponding month last year 2,406 deaths were reported, which is a rate of 11.6. By important ages, the deaths were: Under 1 year, 322; 1 to 5, 175; 5 to 10, 98; 10 to 15, 54; 15 to 20, 83; 65 and over, 666. Some important causes of death were as follows: Consumption, 279; other forms of tuberculosis, 38; typhoid fever, 105; diphtheria, 68; scarlet fever, 18; measles, 6; whooping-cough, 6; pneumonia, 241; diarrheal diseases, 35; cerebrospinal meningitis, 20; influenza, 11; puerperal septicæmia, 11; cancer, 94; violence, 163; and smallpox, 1.

The city death rate during the month was 15.5, which is 3.3 higher than the State rate for the same month. In the corresponding month last year the rate was practically the same as this year. The country death rate is 10.4. In the corresponding month last year it was 9.7.

Smallpox.—324 cases with one death in 33 counties occurred in November—exactly the same number of cases and deaths as in October. In the corresponding month last year there were 441 cases, with two deaths, and 40 counties were invaded. Deaths from *tuberculosis*, 279, a rate of 135.2 per 100,000. The same month last year the deaths numbered exactly the same, which is another remarkable coincidence to be noted.

Typhoid fever caused 105 deaths. The death rate from this cause for the whole State was 50.9 per 100,000. The city rate was 44.7, country rate 54.4.

Pneumonia deaths 241, a rate of 116.8 per 100,000. In the corresponding month last year, the rate was 87.7. The disease prevailed very much more extensively in the cities than in the country, the rates being, respectively, city, 179.1 per 100,000; country, 84.5. Pneumonia does not lead consumption as a cause of death in Indiana, and has only done so in one or two months in the last four years.

Violence deaths, 163, rate 79.0. Of the violent deaths, 4 were murders, 27 suicides, and the rest accidents.

LOUISIANA.—New Orleans, 310,000—77,714 colored. Report *for December*, 1903: Total deaths, 287 white, 285 colored—752;

deaths under 5 years, white 76, colored 44. Death rates: Whites, 25.74; colored, 38.31 : 29.09. Deaths from typhoid fever, 5 white, 6 colored; influenza, 29 white, 3 colored; tuberculosis of the lungs, 56 white, 34 colored; pneumonia, 67 white, 22 colored; Bright's disease, 34 white, 16 colored; cancer, white 13, colored 6; senile debility, white 33, colored 14.

MASSACHUSETTS.—Boston, 600,929. Health Department report for September, 1903: Deaths, 843—306 under 5 years. Death rate, 16.83. Deaths from typhoid fever, 19; diphtheria, 9; phthisis, 97; cancer, 37; organic diseases of the heart, 63; bronchitis, 13; pneumonia, 24; broncho-pneumonia, 25; diarrhea and enteritis (under 2 years), 103; nephritis, acute, 22; Bright's disease, 11; external causes—violence, accidents, etc., 40.

Cases of contagious and infectious diseases reported: Chicken-pox, 8; cerebrospinal meningitis, 3; diphtheria and croup, 140; tuberculosis, 152; measles, 52; scarlatina, 65; typhoid fever, 126.

MICHIGAN.—There were 2,942 deaths returned to the Department of State for the month of December, or 319 more than reported for the previous month. Death rate was 14.1, as compared with 12.9 for November. Deaths of infants under 1 year, 490; from 1 to 4 years, 191; and of persons over 65 years of age, 944.

Important causes of death were as follows: Tuberculosis of the lungs, 158; other forms of tuberculosis, 33; typhoid fever, 48; diphtheria and croup, 96; scarlet fever, 17; measles, 16; whooping-cough, 23; pneumonia, 376; influenza, 49; cancer, 151; accidents and violence, 182.

There was a decrease in the number of deaths reported from typhoid fever, and the usual seasonal increase in deaths reported from pneumonia and influenza.

MINNESOTA.—Minneapolis, 240,000. Report for November: Deaths, 215—43 under 5 years. Annual death rate for twelve months ending November 30, 9.65. Deaths from typhoid fever, 9; consumption, 26; cancer, 16; organic heart disease, 11; other diseases of the circulatory system, 11; pneumonia and broncho-pneumonia, 21; Bright's disease, 10.

St. Paul, 175,000. Report for November: Deaths, 126—22 under 5 years: death rate, 8.40. Deaths from consumption, 8; pneumonia, 10; cancer, 10; typhoid fever, 1; scarlet fever, 4.

MISSOURI.—St. Louis, 645,000. Report for November: Deaths, 822—160 under 5 years: annual death rate, 15.48. Deaths from

zymotic diseases, 84; scarlatina, 9; diphtherian croup, 12; whooping-cough, 1; typhoid fever, 24; remittent fever and congeners, 3; diarrheal diseases under 5 years, 10; cancer, 34; phthisis, 98; bronchitis, 32; pneumonia, 68; other diseases of the respiratory organs, 43; diseases of the circulatory system, 72; Bright's disease and nephritis, 31; accident, 41.

NEW JERSEY.—Hudson County (Jersey City and environs), 421,692. Report for November: Deaths, 552—135 under 5 years; death rate, 15.7. Deaths from croup, 9; diphtheria, 15; scarlet fever, 9; whooping-cough, 2; typhoid fever, 5; all zymotic diseases, 50; phthisis, 64; bronchitis, 12; pneumonia, 93; cancer, 8; violence, 36; still births, 45.

Newark, 266,000. Report for the week ended January 9: Deaths, 124—32 under 5 years; death rate, 23.70. Deaths from contagious and infectious diseases, 34; diphtheria, 5; consumption, 16.

NORTH CAROLINA.—Bulletin of mortality for November summarizes reports of 28 towns, with aggregate population 163,200: white, 94,950, colored, 68,250; deaths, respectively, 113, 152: 265; death rates, 14.3, 26.7: 19.5. Deaths: from consumption, white, 12, colored, 23: 35; heart diseases, white, 9, colored, 14: 23; diarrheal diseases, white, 13, colored, 13: 26; typhoid fever, white, 9, colored 4: 13; deaths under 5 years, white, 29, colored, 48: 77; still born, white, 5, colored, 13: 18.

OHIO.—Cleveland, 420,000. Report for November: Deaths, 522—151 under 5 years; annual death rate, 14.91. Deaths from typhoid fever, 20; diphtheria and croup, 26; tubercle of lungs, 48; pneumonia, 43; broncho-pneumonia, 11; cancer, 26; heart diseases, 27; Bright's disease, 19; diarrhea and enteritis (under 2 years), 14; early infancy congenital icterus, debility, etc., 43; senile debility, 18; still births, 35.

PENNSYLVANIA.—Philadelphia, 1,378,624. Report for week ended January 2: Deaths, 607—153 under 5 years. Deaths from apoplexy, 33; Bright's disease, 9; consumption, 62; diphtheria, 23; croup, 3; diseases of the heart, 51; typhoid fever, 20; nephritis, 16; pneumonia, 95; cancer, 17. *Smallpox* cases reported, 78; deaths, 11.

Pittsburg, 354,000. Report for the week ended January 2: Deaths, 163—53 under 5 years; annual death rate, 23.94. Deaths

from diphtheria and croup, 5; whooping-cough, 3; smallpox, 4; typhoid fever, 13; tuberculosis, 10; pneumonia, 26; bronchitis, 7; cancer, 5. Typhoid fever, according to most recent reports from other sources, is approaching epidemic prevalence, attributed to the same cause as Butler's epidemic—foul water and insufficient vigilance with regard to cases brought hither by persons from Butler.

UTAH.—Salt Lake City, 75,000. Report for November: Deaths, 45—6 under 5 years. Annual death rate, 7.20. Deaths from typhoid fever, 3; tubercle of lungs, 4; cancer, 4; organic diseases of the heart, 3; pneumonia, 3; Bright's disease, 4; senile debility, 5.

WASHINGTON.—Seattle, 125,000. Report for November: Deaths, 95—13 under 5 years. Annual death rate, 9.12. Deaths from tuberculosis, 5; typhoid fever, 4; diphtheria, 1; organic heart diseases, 15; Bright's disease, 4; cancer, 2; pneumonia, 6.

WISCONSIN.—Milwaukee, 315,000. Report for November: Deaths, 325—81 under 5 years; annual death rate, 12.55. Deaths from typhoid fever, 4; diphtheria and croup, 5; phthisis, 29; pneumonia and broncho-pneumonia, 29; bronchitis, 15; cancer, 17; organic heart disease, 29; diarrheal diseases, under 2 years, 15; Bright's disease, 21; congenital debility, 25; senile debility, 21; violence, 25; suicide, 6; accidents, 18.

PHILIPPINES.—Manila, 219,941. Report for July, 1903: The decrease in the population of the city since the Board of Health census of 1901 is attributed to the return to the provinces of persons who had previously sought security in Manila as a result of the unsettled conditions prevailing in the country districts after the late insurrection.

Population of Manila.—Americans, 4,389; Filipinos, 189,782; Spaniards, 2,528; other Europeans, 1,117; Chinese, 21,230; all others, 895; total, 219,941.

During the month there were 42 cases of cholera in the city, with 38 deaths. It will be noticed that the disease was of a very virulent type. These cases were scattered through the month, only one or two occurring daily. During July the city was threatened with a most serious outbreak of cholera, as a very active epidemic developed in the towns of Montalbon, San Mateo, and Mariquina, lying along the Mariquina River above the intake of the Manila

water supply. As the authorities of Rizal Province, in which these towns lie, showed themselves unable to properly cope with the situation, the Board of Health for the Philippine Islands assumed immediate charge of sanitary matters, sent a corps of physicians, sanitary inspectors, and disinfectors to the Mariquina Valley from Manila, obtained a larger military guard for the purpose of quarantining the river, established the pail conservancy system for the reception of human excreta in Mariquina and San Mateo, and organized an efficient corps of scavengers for the collection and proper disposal of the same. By these measures the infection of the Manila water supply, which at first appeared almost inevitable, was avoided and the disease stamped out in thirty days. Much credit for the results obtained should be given to Dr. Arlington Pond, the medical inspector in charge, who handled this most difficult problem with marked energy and discretion.

As a result of the measures taken for its control, and particularly as a result of the preventive inoculation of the Chinese, the plague situation for the month showed marked improvement.

With the establishment of the rains the usual seasonal decrease of smallpox has been noted.

Deaths from all causes, 620—363 under 5 years. Aggregate annual death rate, 33.21. Americans, 4, death rate, 10.74; Filipinos, 569, death rate, 35.32; Spaniards, 3, death rate, 13.98; other Europeans, 2, death rate, 21.09; Chinese, 41, death rate, 22.75; all others, 1, death rate, 13.16.

Deaths from typhoid fever, 7; intermittent fever and malarial cachexia, 10; cholera, 33; dysentery, 18; plague, 7; other epidemic infections, 23; tuberculosis of the lungs, 68; eclampsia (non-puerperal), 42; convulsions of children, 154; bronchitis, 56; diarrhea and enteritis, 34; cancer, 3; pneumonia, 1!

CUBA.—Chief Sanitary Officer reports on vital statistics for the month of October, 1903: Within the district of Havana the total mortality was 476, against 425 in the preceding 31 days, and against 412 in October, 1902. Annual death rate of 21.35. The mortality among children under 5 years old, 115, as against 123 in the preceding month, and 98 in October of last year. The increased death rate as compared with that of the preceding month was principally due to scarlet fever (+ 20); cerebral hemorrhage or congestion (+ 11); diseases of the heart and arteries (+ 15); diseases of the kidneys (+ 6); infantile tetanus (+ 4). There was, however, a marked decrease in the deaths from tuberculosis

(82 against 93); from infantile diarrhea (11 against 25); from simple meningitis (24 against 37).

The Havana Sanitary Department has been kept busy during this month endeavoring to control the propagation of scarlet fever, which, though of a mild type, has reached a figure unprecedented in our records. On the 30th of September there were 82 cases on hand, 6 deaths having occurred in that month, while on the 31st of October there were 465; 534 new cases having been reported during the month, with 26 deaths. All the confirmed cases, even those of a mild type, have been isolated either at their homes or in a special ward at "Las Animas" Hospital; that ward and its *personnel* being carefully isolated from the rest of the establishment. Schools where any cases had developed were ordered to be closed, and children from infected premises forbidden from going to school. A sign of warning is placed at the door of every infected house or room, and, when necessary, a guard is placed at the entrance to prevent undue communication. The premises are disinfected as soon as practicable after the patient has been removed or after the skin has ceased to peel off. Laundries in which cases have been discovered are either closed or not allowed to deliver clothes without previous disinfection by the Department.

No case of yellow fever or of smallpox originating on the island has been reported. Three cases of yellow fever have, however, been imported from Veracruz. One arrived October 6th, on the steamship Monterey; the other two arrived October 9th on the steamship Prinz Adalbert; all three were discharged cured.

Of the 82 municipalities on the island 61 (including Havana and representing an aggregate population estimated at 1,534,766 inhabitants) have sent in their reports showing 1,694 deaths from all causes in the month of October, equivalent to the annual death rate of 12.93 per thousand. No quarantinable diseases figure in any of those reports. Sporadic cases of scarlet fever have occurred in Matanzas, Batabano, Guines, Guanajay, Cienfuegos, all of which towns have railroad communication with Havana, but so far in none of those places has the disease showed any signs of spreading.

Report for the year 1902: The death rate of Havana from all causes decreased from 48.20 in 1871 to 21.20 in 1902; the mortality from tuberculosis decreased from 7.38 in 1872 to 3.43 in 1902; the mortality from yellow fever decreased from 5.21 in 1871 to ***nil*** in 1902. The same is true for smallpox, which disease caused a death rate of 5.92 during 1871, with no death reported from ***this cause during 1902.***

BOOK REVIEWS.

CHILDREN OF THE TENEMENTS. By JACOB A. RIIS, author of "The Making of an American," "The Battle with the Slums," "How the Other Half Lives," etc. 12mo. Pp. 387. Price $1.50. New York: The Macmillan Co.

A little about Mr. Riis will doubtless add to the reader's interest in "Children of the Tenements" and other books which he has written. He was born in 1849 in the town of Ribe, on the northeast coast of Denmark. His boyhood and youth, of which he

MR. JACOB RIIS.

writes with the most genuine charm in the early portion of "The Making of an American," were spent in his native town, except for four years when he was in Copenhagen learning his trade as a builder's apprentice. But all this time he loved his boyhood's sweetheart; and when her parents decided that a common carpenter would not do for their beautiful daughter, he went out into the world to seek his fortune. It was on Whit-Sunday, 1870, that the Glasgow steamer landed Mr. Riis in New York, "with a pair of strong hands and stubbornness enough to do for two." Thereafter he plunged into any kind of work which he could get to do, *at one time* toiling among a settlement of honest Welshmen in the

back hills, later in a coal mine, again for a truck-farmer, still later in a brick yard, always hunting for some steady employment that would give him a living and a future. It was a long road indeed before he learned to make his way against the current and really began life as a newspaper man. He made a success of his newspaper, and returned to Denmark for his sweetheart; but it was not for some months after his marriage that he really began the work of his life as a reporter at police headquarters on Mulberry street, New York.

He plunged waist deep into everything that was worth while, every movement for law and order and decency and right and freedom and better civilization. But through it all he had a great deal of fun, besides doing an immense amount of good; and that is one reason why his book, "The Making of an American," published two years ago, is still one of the most popular books in the United States. Much of it, though happy and gay, is more deeply and genuinely affecting than the saddest fiction ever written; and from beginning to end it tells the story of one of the bravest fights against all kinds of obstacles that has ever been waged. The book abounds, too, in good stories, such as the famous one about the fireman who, wishing to honor the memory of the dead reporter, but being obliged through press of time to leave it to the florist, found themselves on the solemn occasion face to face with a huge wreath bearing the legend, "Admit Within Fire Lines Only." "We will strive together for all that is noble and good" has been the text of Mr. Riis' whole life; and he sums up his career in the two simple sentences: "I have been very happy. No man ever had so good a time." And the book is all written with the vigor and the almost riotous zest in living and doing which has been Mr. Riis's driving power throughout his notable career.

"I never could fake anything; I have sometimes wished I could," he remarked in reply to some inquiries about "Children of the Tenements." And he went on to say that every incident related in the book as fiction actually happened within his own knowledge. Incidents have been grouped together which did not happen consecutively; but every incident and scene has actually happened in the way set forth. Some things can be told a great deal better in fiction than through any other medium; and this volume presents the most complete and the truest and the most varied picture of the New York slums which has ever been created. The fact that the pooper people are the more kind and charitable and generous they are to each other has never been more strongly brought out.

The people of the tenements as they are in their everyday lives, and in their holiday seasons, too, become living, breathing human beings to the reader of this book, who finds himself entering into their joys and sufferings, their hard work and their play and their deprivations, and learning to know them as human beings with all the traits and wishes and qualities and hopes that the rest of us have. For a quarter of a century Mr. Riis has been better acquainted with the New York tenement house region than anyone else who could write, and his new volume portrays with wonderful skill and unfailing sympathy and love the significant and interesting people who live in that quarter of the Metropolis. Three or four of these are Christmas stories, and all have to do with the children, young or old, of the tenements. The book is brought fittingly to a close by an article entitled "Making a Way Out of the Slum." Some of these stories are merry and lighthearted as the children themselves; others are powerful or tragic, two or three are gloomy, and still others are whimsical.

The volume is illustrated with a number of excellent pictures by Mr. C. M. Relyea and others who have made a special study of tenement house life, and the publishers have given it an attractive dress. It rounds out and completes the story of what Mr. Riis has seen and contended with in the long "Battle with the Slum."

INFECTION AND IMMUNITY; OR, THE CAUSES AND PREVENTION OF INFECTIOUS DISEASES. By GEORGE M. STERNBERG, M.D., LL.D., Surgeon-General U. S. Army (retired); ex-President of the American Medical Association, and of the American Public Health Association; Honorary Member of the Epidemiological Society of London, of the Societé Français d'Hygiene, of the Royal Academy of Medicine of Rome, etc. 8vo. Pp. 293. Illustrated. Price (by mail, $1.90), net, $1.75. G. P. Putnam's Sons, New York and London.

This volume is intended for non-medical readers, hence it is for the most part devoid of technicalities and the discussion of the more or less theoretical investigations of the nature of the "antitoxins," "agglutins," "precipitins," "bacteriolysins," etc. Nevertheless, the relation of this line of investigations is so clearly implied as to render it comprehensible to the lay reader. Moreover, while the book is intended for non-medical readers, it is none the less commendable to the medical, and particularly to sanitary officers, for its lucid and commendable practicability. All infectious diseases are considered preventable diseases, and the purpose

of the book is to indicate the necessary measures and means for preventing them. It is divided into chapters, as follows: General Remarks upon Infection; Disease Germs; Channels of Infection; Susceptibility to Infection; Methods of Disinfection; Tests of Disinfection; Disinfection by Heat; Sunlight as a Disinfectant; Disinfection by Gases; Various Chemical Disinfectants; Natural and Acquired Immunity; Antitoxins; Plague; Cholera; Forms of Fever; Tuberculosis; Diphtheria; Influenza; Pneumonia; Smallpox; Measles; Wound Infections; Tetanus; Hydrophobia.

BACTERIA, YEASTS AND MOLDS IN THE HOME. By H. W. CONN, Ph.D., Professor of Biology in Wesleyan University, Middletown, Conn.; author of "Agricultural Bacteriology," "Bacteria in Milk and Its Products," "The Story of Germ Life," "The Method of Evolution," etc. 12mo. Pp. 300. Illustrated. Price $1.00. Boston, U. S. A., and London: Ginn & Company.

Molds, which are the cause of mildew, the spoiling of many foods, and the decay of fruits; yeasts, which are the foundation of fermentation in the raising of bread; and bacteria, which cause food to spoil, meat to decay, and contagious diseases to spread—all these phenomena which are of the most vital importance, are presented in an interesting and helpful manner. The subjects are discussed in a popular manner, devoid of technical terms and admirably adapted to the needs of the housewife, the student of domestic science, and all others interested in home economics.

The author explains the various actions of bacteria, and points out the sources of trouble and the principles which underlie the methods to be adopted for avoiding their effects. Special attention is paid to the problems of food preservation and to the practical methods which can be used in the home for preventing the distribution of contagious diseases.

To render the work more useful for classes in domestic science there is added an appendix containing directions for a series of simple experiments which will give to the student a practical knowledge of the most important properties of micro-organisms.

THE PRACTICAL CARE OF THE BABY. By THERON WENDELL KILMER, M.D., Associate Professor of Diseases of Children in the New York School of Clinical Medicine; Assistant Physician to the Out-Patient Department of the Babies' Hospital, New York; Attending Physician to the Children's Department of the West Side German Dispensary, New York. 12mo. Pages xiv-158, with 68

illustrations. Extra cloth, $1.00, net, delivered. Philadelphia: F. A. Davis Company, 1914-16 Cherry street, Publishers.

A concise presentation of such knowledge as every mother and nurse should possess. It begins with the bath, its temperature, when and how to use it, and proceeds to describe the needful clothing, material and seasonableness indoors and out. Food and feeding, weaning, and incidental conditions requiring attention for the promotion of healthy development. Gives a lucid description of the early symptoms of the diseases to which infants and children are particularly liable; tells how to meet emergencies, and concludes with a number of practical food recipes. The illustrations throughout are excellent and instructive.

REPORT OF THE COMMISSIONER OF EDUCATION FOR THE YEAR 1902. Vol. I. Pp. cxii, 1176. Washington: Government Printing Office.

The enrollment in schools and colleges, public and private, in the United States, during the year was 17,460,000—an increase of 169,770 over the previous year. Of this number there were enrolled in public institutions supported by taxation and funds belonging to the States and municipalities, 16,041,016, as against 15,710,394 for the previous year. Moreover, there were pupils enrolled in special institutions more or less educational in their character and more or less of a practical and business character: city evening schools, business schools, Indian schools, reform schools, orphan asylums, private kindergartens, etc., 620,840. All these are tabulated and a comparative summary presented, showing the increase from decade to decade for more than thirty years in common schools—including under this designation schools of the elementary and secondary grades supported from public funds; by which it appears that in the last six years of the period the per cent. of the total population enrolled in the common schools has not materially changed, being between 20 and 21 per cent. of the entire population, and about 72 per cent. of the entire number of persons from 5 to 18 years. The number in daily attendance during the sessions of the schools has risen from about 4,000,000 in the year 1869-70 to nearly 11,000,000 in the past year. Meanwhile, the number of women teachers has risen to 317,204 out of a total number of 439,596. Twenty-two years ago the percentage of male teachers was nearly 43, while the past year it had fallen below 28. The average salary of teachers shows a slight increase, that of *men being* nearly $50 a month, and of women nearly $40. The

average expenditure per pupil of average attendance has constantly increased since 1880, the total expenditure being $12.71 per pupil in 1880 and $21.38 in 1902.

The number of public high schools increased from 2,526 in 1890 to 6,005 in 1900, and to 6,292 in 1902.

The number of students in universities and colleges during the year was 119,496—an increase of 4,225 over the previous year.

The college-bred negro is the subject of a special chapter. A report by Prof. W. E. Burghardt Du Bois, of Atlanta University, based on a study of 2,331 graduates, of whom 1,941 were from negro and 390 from white colleges, tends to show that the standing and character of negro students in Northern white colleges are at least as good as those of the average of white students. The chosen field of the college-bred negro appears to be in the South. Nearly 90 per cent. of the Southern-born graduates remained in the South, while of the Northern-born about 50 per cent. went South. That there are so many earnest spirits among the youth of the race is an encouraging sign.

The systems and status of education in foreign countries are also presented in considerable detail.

Education of the Will.—The closing lecture of the course in Pedagogy, delivered at Sarbonne, June 22, 1899, by F. Buisson, Professor at Sarbonne, is the subject of a special chapter, eminently worthy of separate publication and the widest possible distribution.

Altogether the report is replete with information of practical importance to all persons interested in the progress of education and the means by which it may be promoted.

ANNUAL REPORT OF THE BUREAU OF ANIMAL INDUSTRY, 1892. 8vo. Pp. 651. Department of Agriculture, Washington: Government Printing Office.

It opens with a concise but comprehensive statement of the work by D. E. SALMON, D.V.M., Chief of the Bureau. This is followed by twenty-eight special reports on subjects of interest to all persons concerned with the animal industries of the United States and animal diseases in their relation to the public health. Particularly worthy of notice are the reports on "The Duration of the Life of the Tubercle Bacillus in Cheese," by F. C. Harrison; "Bovine Tuberculosis and Other Animal Diseases Affecting the Public Health," by D. E. M. Salmon, and "Contagious Diseases of Animals in Foreign Countries," by George Fayette Thompson. Indeed, the volume altogether is replete with matter of interest to *sanitarians.*

THE WORLD'S COMMERCE AND AMERICAN INDUSTRIES. Graphically illustrated by 86 charts. Prepared by John J. Macfarlane, A.M., Librarian. Price 50 cents. The Philadelphia Commercial Museum.

A brochure of 111 pages, illustrating the progress and present condition of the commerce of the world, of the manufacturing industries of the United States, and of British and American shipping.—The graphic method shows more clearly than statistics alone would do what proportion of the world's trade belongs to each of the principal nations, and the relative importance, from a manufacturing standpoint, of the leading cities of the United States.

An alphabetical list of the cities of the United States having an output of over $20,000,000 of manufactured goods, according to the census of 1900, is also given, with the leading industries of each city.

BOOKS AND PAMPHLETS RECEIVED.

Disinfection and the Preservation of Food. By Samuel Rideal, D.Sc.

Practical Hygiene. By Charles Harrington, M.D.

The Blues, Causes and Cure. By Albert Abrams, A.M., M.D., F.R.M.S.

Hygiene and Sanitation. By Seneca Egbert, A.M., M.D.

Self-Cure of Consumption without Medicine. By Charles H. Stanley Davis, M.D., Ph.D.

Spotted Fever (Tic Fever) of the Rocky Mountains. By John F. Anderson, Hygienic Labroatory Bulletin 14, Washington, D. C.

Clinical Study of Organic Iron. By John V. Shoemaker, M.D., Philadelphia.

Aphtha and Herpes Contracted by Children Drinking Milk from Cows Suffering with Foot and Mouth Disease. By E. F. Brush, M.D., Mount Vernon, N. Y.

Malignant Tumors of the Naso-Pharynx. By Francis J. Quinlan, M.D., New York.

Recent Advances in the Management of Diseases of Children. By Charles Gilmore Kerley, M.D., New York.

Management of Catarrhal Pneumonia in Infants. *Ibid.*

Sources and Methods of Infection in Pulmonary Tuberculosis. By J. O. Cobb, M.D., U. S. Public Health and Marine Hospital Service.

Some Recent Advances in Medical Therapeutics. By Thomas E. Satterthwaite, M.D., New York.

Antiseptic and Germicidal Properties of Glycerin. By M. J. Rosenau. Bulletin 16, Hygienic Laboratory, Washington, D. C.

Management of Exacerbations in the Course of Pulmonary Tuberculosis. By John F. Russell, M.D., New York.

Was it Wise of the American Medical Association to Change its Code of Ethics? By D. W. Cathell, M.D., Baltimore, Md.

Child-Labor Legislation. Handbook 1904. National Consumers' League, 105 E. Twenty-second street, New York.

CONTEMPORARY LITERATURE.

SUCCESSFUL WOMEN OF AMERICA.

The tendency of successful women to marriage does not seem great, the per cent. being only 54. In every case, except the minister and lawyer, the table shows less than sixty per cent. married, and it seems probable that a large number of the women in these professions married before they entered professional life. The journalist comes next in the per cent. married, while the artist falls to 42 per cent., and the educator runs very little risk—if she considers it a risk—her chances of matrimony being only 26.3 per cent., or a little over one to four. The cause of this invites speculation. Is it merely disinclination on her part, or is it because she has less opportunity for meeting congenial men; or can it be that her acquisition of knowledge and possibly the *instructive habit* makes her less attractive to men? At any rate, success and matrimony do not seem to go hand in hand with the educator. It will doubtless cause surprise that the table shows only about half the successful actresses married. This may be due to their omitting the fact of their marriage, because they find it to their advantage professionally to be supposed unmarried, and it may possibly be due to the fact that they seem to *unmarry* with so much ease.—Amanda Carolyn Northrop, January "Popular Science Monthly."

Mr. H. B. Marriott Watson's "Nineteenth Century" article on "The Deleterious Effect of Americanization Upon Woman," which has attracted so much notice and has been read with mixed emotions by Americans, is published entire in "The Living Age" for December 5.

TROUBLE ON THE TRAIL.

The movement of Texas cattle northward had hardly begun before it was noticed that a malignant disease broke out among native cattle along the trail over which the driven herd had passed.

Kansas stockmen, living along the trail or on the prairies where the Texas cattle were located, lost from 50 to 90 per cent. of their cattle. The disease raged throughout all the States of the middle West. In the spring of 1868, large numbers of Texas cattle were shipped up the Mississippi and scattered through the States of Illinois, Indiana, and Kentucky. The disease broke out in almost every community where Texas cattle were located. In one Illinois community five thousand cattle died of "Texas fever," and in another eighteen thousand. One Illinois farmer started three hundred and twenty fat cattle to market after they had been in contact with cattle from Texas; two hundred and twenty-four died before they reached their destination. According to the health officers of Chicago, in 1868 every cow but one living within two miles of the stock-yards where Texas cattle were kept perished of the dread disease. All over the West a strong feeling grew up against admitting Texas cattle, and, in some cases, force was used by stockmen along the trail to protect their cattle from destruction. Nor was the alarm caused by the disease confined to the West. Infected cattle had been shipped to the Eastern markets, and were dying along the way and in the New York stock-yards. The question as to the effect of such diseased flesh upon human health was a new one, and caused much uneasiness. The matter was taken up by the cattle commissioners of New York State, and the Board of Health of New York City made a vigorous effort to check the importation of diseased cattle from the West. . . .

Nothing positive was known in regard to either the cause of the disease or the manner of its transmission until the subject was taken up by the Bureau of Animal Industry in 1889. Under the general supervision of Dr. D. E. Salmon, chief of the bureau, a systematic investigation of the subject was begun at the experiment station, near the city of Washington. In the laboratories of the station, one of the best pieces of biological research that this country has witnessed was carried on by Dr. Theobald Smith, Chief of the Division of Animal Pathology, now a member of the Harvard medical faculty.—From "The Texas Cattle Fever: How Science is Winning a Long Fight," by Prof. Charles Shirley Potts (Agricultural and Mechanical College of Texas), "American Monthly Review of Reviews" for January.

BEANS VERSUS LITERATURE.

The best that may be said for Thoreau's regimen of beans is, not that that immortal diet was merely wholesome or cheap, or

even that it was transmuted into delightful literature—but that Thoreau liked it. He was catering for himself and to himself. When Byron came of age, he provided the conventional roast ox and ale for his tenants in honor of his majority, and then betook himself to London, where he dined alone upon his favorite delicacy, ham and eggs. He catered for his public at Newstead, and to himself in town. But the only editors who permit themselves such solitary luxury of personal indulgence are the young men who own, write, and print the queer little $4\frac{1}{2} \times 7$ magazines with still queerer names. They give no hostages to fortune except paper, printer's ink, and time. If you would seek a better analogy to the real editorial function, follow some excellent citizen of Baltimore, or of a foreign city where marketing bears as yet no social stigma, as he journeys to the public market, with basket upon his careful arm, intent upon selecting a dinner for his family. —The January "Atlantic."

THE CARE OF THE COMPLEXION.

A woman's complexion gives her more concern than anything else, for it is one of her chief attractions. If the skin is coarse and covered with pimples or other blemishes she loses more than half her charm, and, not only that, she looks unwholesome. It is within the power of almost every one to have a healthy skin. Doubtless many poor complexions are due to constitutional troubles, indigestion, imperfect circulation, etc. These in nearly every case can be remedied by the physician. Moles, birthmarks and other such blemishes also can usually be removed by the surgeon or skin specialist. Other facial detractions, such as pimples and blackheads, it is largely within the province of the individual to treat; at least she can greatly assist the physician by proper care of the complexion. A beneficial system of facial treatment is described by Dr. Grace Peckham Murray in a very instructive paper on the complexion in the February "Delineator." The illustrations are an effective addition to the article.

WHAT IS A SCAB.

Under the definition that a scab is *one who gives more value for the same price than another,* it would seem that society can be generally divided into the two classes of the scabs and the non-scabs. But on closer investigation, however, it will be seen that the non-scab is almost a vanishing quantity. In the social jungle everybody is preying upon everybody else. As in the case of Mr.

Rockefeller, he who was a scab yesterday is a non-scab to-day, a to-morrow may be a scab again.

The woman stenographer or book-keeper who receives fo dollars per month where a man was receiving seventy-five i scab. So is the woman who does a man's work at a weaving r chine, and the child who goes into the mill or factory. And father who is scabbed out of work by the wives and children other men, sends his own wife and children to scab in order save himself.—Jack London in the January "Atlantic."

THE PROCTOR THEATRES.

A few Sundays ago the vast reading public of New York C was somewhat mystified to understand the meaning of a very sn but significant advertisement, appearing in certain obscure pla in all the daily newspapers. Each advertisement had someth to say about the "Proctor Plan." When Mr. Proctor was asl as to the solution of the problem, he simply answered: "T 'Proctor Plan' just consists in taking care of the Proctor audien at the Proctor theatres; that is to say, it is a part of the 'Proc Plan' to furnish each auditor with a clean, wholesome show, a plenty of it; with courteous attention from the moment one ent the doors, until one leaves it; with pleasant and agreeable s roundings, alike for young and old, and finally to leave all com with the impression that they have received more than th money's worth, which in all cases is really a fact."

That veteran but gay and graceful minstrel, George H. Pr rose, who has been nearly thirty-five years on the stage, and s gives the impression of perennial youth, had something to say cently about the Proctor playhouses, in which he is at pres playing. "In all my long experience," said Mr. Primrose, "I h never passed a more pleasant engagement than I am now play on the stages of Mr. Proctor's various theatres. They show most conclusively the high degree of perfection attained by modern vaudeville playhouse. Twenty, yes, even ten years ag would not have believed it possible that the patrons of what were then wont to call a variety show would ever be enabled enjoy their favorite form of entertainment amid luxurious s roundings, managed with such rare skill, and affording so m delight to the thousands of people gathered within the four wa Not alone does the beauty of the theatres themselves compel att tion, but in the careful detail of the handling of the stage ther *much to* wonder at and to praise."

THE SANITARIAN.

MARCH, 1904.

NUMBER 412.

A STUDY OF THE CLIMATE OF LONG ISLAND.*

By WILLIAM H. ROSS, Brentwood, L. I.,

Member Suffolk County Medical Society; Associated Physicians of L. I.; State Medical Society of New York; American Medico-Psychological Society; Consulting Physician Manhattan State Hospital, etc.

The proximity of Long Island to the greatest center of population in this country, and the increasing use of its territory as a resort and place of residence, make valuable any study of its climatic features.

Though Long Island is one of the oldest settled portions of the United States, little seems to be known of its healthfulness by the medical profession in general. Medical men who have been everywhere and who know everything have never been on Long Island, nor know anything about it. It is often thought to abound in marshes, malaria and mosquitoes. Practically the opposite is true. It is, for the most part, a dry, sandy plain, rising gently from the south shore to the north, and terminating in a bluff, with beautiful bits of scenery on land, and magnificent views at sea. To the north the distant hills of Connecticut, and to the west, the palisades of the Hudson can be seen, and to the south, the waters of the Atlantic in all of its grandeur.

Through the center of the island is a range of hills from 100 to 400 feet in height. Between the bluff and the central hills is an elevated plain of fertile soil supporting a growth of deciduous trees, many of the old ones of large size. South of the central hills, sloping to the water with a fall of about twenty feet per mile, is an almost unbroken sandy plain covered by a pine forest.

*Read at Meeting of the Medical Society of the State of New York, January 27, 1904.—Advance Sheet from Transactions by courtesy of the Secretary.

Along the south shore lies the Great South Bay, from two to five miles wide and 100 miles long, and separated from the ocean by a sandy bar averaging one-half mile wide—varying in width by the force of violent storms.

There are two navigable rivers on the island, and a number of small inland lakes of fresh water; especially in the eastern half. Some of these have no visible inlet or outlet.

The central part of the island, only fifty miles from New York City, is yet largely an unbroken forest, except for the small villages, and is in such a state of nature that hundreds of wild deer inhabit its more remote portions.

Long Island, as you know, lies about twenty miles off the New England coast, separated by that inland sea, Long Island Sound. It is approximately fifteen miles wide, and one hundred and twenty miles long, containing nearly 1,000,000 acres; and yet with only 1,682 square miles of territory, it has 250 miles of water front, counting the Sound, its bays, and the ocean. It is the only considerable portion of the Atlantic coast entirely surrounded by water, and receives all its attendant influence diminishing the difference between the temperature of winter and summer, and day and night.

Formation.

Long Island is of glacial formation. The greater part consists of sand and gravel and occasionally a layer of clay, overlaid with drift, growing thinner toward the south shore. The drift proper is a heterogeneous mixture of sand, gravel, clay, and, at the western end, boulders. Under this is a deposit of coarse yellow gravel and sand, brought to its present place by glacial action, but existing in a stratified condition before the arrival of the glacier. This yellow gravel and sand drift in a comparatively unaltered state forms the soil of the pine barrens of the region south of the central hills. (Merrill.) At the western end of the island the glacial drift proper attains its maximum depth, and diminishes toward the eastern end, its average depth for fifty miles being not more than three or four feet.

The strata underlying the drift contain, at the western end of the island, many rocks tilted at an angle and identical with the formation of Manhattan Island. A large amount of sand and gravel, increasing in amount toward the eastern end, and in places strata of clay are found. The clay overlies white laminated sands,

and under these again are layers of clay and layers of sand, the sand largely predominating. Wells bored at different parts of the island show that under the sandy loam, varying in depth from an inch or two to three feet, the soil is made up of stratified layers of sand and gravel with an average of not more than three feet of clay per hundred feet. My own specimens from several places show no clay to a depth of 100 feet; in other places only three feet of clay was found to a depth of 200 feet. In one well near my home vitrified clay to a depth of six feet was found, fifty feet under the surface, but except thin layers of clay at varying depths—due probably to glacial folding—only laminated sand and gravel is found to a depth as deep as the deepest wells have been made.

The clay strata under the surface of the island dip toward the south, falling about 10 per cent., as shown by the ground-water level, but thrown into numerous folds, pitched at varying angles.

The stratified sands and gravel which overlie the supposed Cretaceous and Tertiary beds contain fossils which determine their age beyond question. Their high elevation must be due to their having been raised to their present position by glacial action. The pressure of the ice sheet threw into a series of folds the stratified sand, gravel and clay, and then pushing onward rode over them carrying an immense mass of sand, gravel and débris from New England and New York.

It is probable that Long Island Sound was a body of water—an arm of the sea—previous to the arrival of the ice sheet; for opposite the narrowest parts the glacial drift on the island is greatest, and least opposite the widest part, where the ice sheet lost the greater part of its glacial drift.

Of course many changes have occurred on the island since the retreat of the glacier. These are mainly on the surface and in the coast line. The swift westerly currents are wearing away the eastern end and depositing it along the shores. The bays are becoming slowly shallower.

It can be shown by a study of its geology that the island is made up mainly of sand and gravel and thin strata of clay, dipping from north to south. Its ground-water currents must, therefore, flow from north to south, and the drainage in the same direction. Wells located to the north of a dwelling will, therefore, be less liable to contamination than if located on the opposite side; and cesspools located on the south side of a residence

will be less liable to contaminate the wells than if their position were reversed.

The character of the soil modifies the climate in respect to fogs. They are more frequent over wet clay soil than over a dry, well-drained soil, such as the sandy soil of Long Island.

Old Greenwich village in New York was traditionally healthy, and this region is so to-day. Epidemics that attacked the old city one hundred years ago found no lodgment in Greenwich. This has always been attributed to the fact that the underlying soil, to the depth of fifty feet or more, is pure sand, and provides excellent drainage. The same condition prevails on Long Island, with the difference that instead of the sand being fifty feet deep it is several hundred feet deep.

The water of the island is very pure. Because of the character of the soil it is freer from organic and inorganic material than wells of other regions not having a sand and gravel soil. There are a great many never-failing springs coming up from the sand along the shores and in the Nissequogue Valley, with a temperature of about fifty degrees the year round; and even in the highlands and in the sandy forests are numerous ponds, all of them sending forth streams of clear, cold, sparkling water.

The existence of the fresh-water lakes referred to as having no inlet or outlet depends on the fact that a basin has been formed in the clay stratum by glacial folding. These necessarily fill from the ground water, and remain pure because of the water filtering through the sand.

Temperature.

During the decade, 1890 to 1900, a consecutive period of 3,650 days, the writer made, at Brentwood, situated in the pine belt—about in the geographical center of the island—daily observations of temperature, wind direction, precipitation, relative humidity, character of day—as to sunshine and other meteorological phenomena—and the following deductions in this paper are made from those records:

The mean summer temperature is 70°. The mean winter temperature is 30°. The mean yearly temperature is 51.80°. For comparison I may add that the mean yearly temperature of the entire State is 45°; Nantucket, 49.5°; New York City, 52°, and Atlantic City, 52.7°. The annual range of temperature of Long Island is 39°, while the annual range for the whole country is from 64°

to 77°. It is least at the eastern and increases toward the western end of the island. The average temperature of the island for the month of July is 3° warmer than Nantucket, and for January 3° cooler, but there is a difference in relative humidity of 7¾ per cent. in favor of Long Island, and the difference in the thermometric readings is practically obliterated because of the drier atmosphere. The temperature of Suffolk County, the eastern portion of the island, averages in summer 5° cooler than New York City. The temperature of this portion of the island in summer is almost the same as that of northern New York and New England, while its temperature in winter is about that of Central New Jersey.

The winter temperature of Suffolk County is higher by 15° than the rest of New York State. The difference is undoubtedly due to the modifying effect of the ocean, giving heat during the winter, and coolness during the summer. When the winds are from the south or southwest the eastern and southern portion of Long Island may be affected by the influence of the Gulf Stream, which, having a yearly temperature of 73°, can communicate to the coast heat sufficient to modify the climate.

Dr. E. T. Turner, Meteorologist to the New York Weather Bureau, says that the nearest approach to a maritime climate along the coast is eastern Long Island. One noticeable feature of this is the retardation of the seasons, amounting to nearly three weeks. The change from one to another is gradual, a valuable feature for the debilitated; for the more gradual the change from season to season the less injurious is the effect. The time of the first killing frost is fully three weeks later on the eastern end than on the western end of the island.

Humidity.

One of the most striking features of the climate is its low relative humidity, especially in the pine region. It is lowest in winter and spring—during the cold months—the reverse of that which occurs inland. This peculiarity is due to the more moderate heat and cold of the island, and to the southwesterly winds in summer.

The average yearly humidity is 72.75 per cent., while Atlantic City is 80.5 per cent.; Block Island, 84.5 per cent.; Nantucket, 80.5 per cent. San Diego, Cal., is 69½ per cent., only 3 per cent. lower than that of Long Island. The entire State of New York is 75.5 per cent. The influence of a low relative humidity for

those seeking relief from chronic inflammatory troubles should be given considerable prominence.

Sunshine.

Probably the most valuable feature of any climate is the amount of sunshine. Its general tonic effect leads to an increased vitality. The amount of sunshine on Long Island is greatest in the pine forest region at the eastern end and southern shore. The average number of clear days is 72 more than New York City, 90 more than Nantucket, and 120 more than the western part of the State.

Including all days in which the sun shines all day, or a part of the day, sufficient to permit exercise in the open air, the eastern half of the island has an average of 300 days, forty more than Atlantic City, sixty more than Narragansett Pier, 104 more than Nantucket, only twelve less than Denver, and 30 less than Phœnix, Arizona; El Paso, Texas, and Los Angeles, Cal.

Long Island, in a surprising way, ranks high among other places having a wide reputation in this feature of climate—which has, perhaps, the greatest influence of all upon the invalid.

Wind Direction.

The influence of the wind direction upon the climate of the island is only understood when we realize that Long Island is really far out at sea, in position approaching a right angle to the mainland. It is so placed that it has 140 miles of longitude, and only 37 miles of latitude. (Trask.) The wind direction in summer is from the south and southwest, from off the Atlantic Ocean. The whole length of the island meets it at nearly a right angle, and as the heated air arises, the breeze, cooled by a large expanse of pure water, blows in to take its place. It commonly penetrates inland eight or ten miles through the whole evergreen forest region, or until it meets the central hills. This is the prevailing condition for six months of the year. In winter the prevailing wind is from the northwest, and produces a continental type of climate, but often there are considerable periods when the wind direction is from the southwest, and Long Island again enjoys the tempering effect of the ocean.

Pine Forest.

The pine forest of the island occupies the portion between the central range of hills and the south shore, six to eight miles in

width, and extends for sixty miles through the whole length of Suffolk County. The trees are nearly all of the yellow pitch pine variety. There is no other evergreen forest of equal size in the State of New York, short of the Adirondacks. (Winfield.) Evergreens are indigenous in all this region. Any cultivated spot abandoned a few years springs up in a thick growth of pines. The whole region is filled with a balsamic odor very noticeable to one not accustomed to living here. The soil, as in all pine-wood regions, is very sandy, insuring dryness and excellent drainage. The belief in the favorable influence of the pines in pulmonary and other affections, and in convalescence from all acute diseases, is general among physicians.

The late Dr. A. L. Loomis, in an article on "Evergreen Forests as a Therapeutic Agent in Pulmonary Phthisis," says that aseptic air has a less powerful curative effect upon suppurative processes than air in which the aseptic condition is due to the persistent presence of some antiseptic agent of sufficient power to destroy existing septic germs.

Evergreen forests have a powerful purifying effect upon the surrounding atmosphere, rendering it antiseptic by the chemical combinations which are going on in them.

The clinical evidence of the beneficial effect of pine forests on phthisical subjects is unquestionable. The changes attributable to the persistent inhalation of air impregnated with the emanations of such forests are such as to indicate that the atmosphere is not only aseptic, but antiseptic—made antiseptic by some element which is not only fatal to germ life, but at the same time is stimulant and tonic to normal physiological processes within the the lung. This element Dr. Loomis believed to be the peroxide of hydrogen formed by the atmospheric oxydation of turpentine vapors.

Adding to the effect of the pine forest the aseptic ocean air which for more than six months of the year is carried through the entire pine region—making, in addition, the temperature cool and more equable—the sandy soil, the effect of the low relative humidity, the large amount of sunshine, Long Island presents climatic features in its pine-forest region not surpassed by any place along the Atlantic coast.

The therapeutic elements desired in a climate are pure air, with freedom from organic and inorganic material, and without excessive dampness; an abundance of sunshine; a sandy soil, and an equable temperature. All these Long Island possesses, and in

addition, the antiseptic elements in the emanations from its pine forest, and the bromine and iodine in its ocean air. Man is essentially modified in his vitality by the influence of climate. Those who live in a good climate possess greater longevity and present greater resistance to disease. Dr. Winfield, of Brooklyn, says that a physician of national reputation once observed that the two healthiest counties in the United States were Suffolk County, L. I., and Berkshire County, Mass. The mortality statistics of Long Island prove its claim to climatic superiority, as evidenced in the longevity of its inhabitants. In my own township in the year 1903 there were 141 deaths from all causes—including infancy. Of these 11 per cent. were between 80 and 100 years: the average age of the 11 per cent. was 86 years. From published reports in Suffolk County during the fiscal year ending July 1, 1891, there were 770 deaths, the average age being 62 years: 526 of the 770 were between 70 and 90 years, and 17 were between 90 and 100 years.

From published records in the years 1885-86-87 there were 3,935 deaths in all of Long Island of those over 20 years of age: 1,394 of them were between 70 and 90 years; 642 between 80 and 100 years; 111 between 90 and 100, and 4 over 100. This is a remarkable showing. I am not aware that it is equaled by any other place in the country.

The climate of Long Island is favorable because of its low altitude in increasing functional activity of circulatory organs; in convalescence from acute diseases, and in surgical diseases to acclerate tissue change; for all invalids who cannot bear great changes of temperature; for pulmonary tuberculosis, because of its pure air, equable temperature and evergreen forest; for neurasthenia, nerve exhaustion and allied nervous troubles requiring relaxation, because of its strikingly sedative qualities, and particularly valuable in insomnia due to nervousness. People who come to central and eastern Long Island are always surprised at first at the increased amount of sleep induced. The atmosphere is always described by one experiencing it for the first time as invigorating and quieting. Among native Long Islanders tuberculosis is one of the rarest diseases, rheumatism is scarcely more frequently met, malaria does not exist except in some sections at the western end.

When Long Island is fully understood, and medical men become familiar with its natural conditions, its sandy soil, favoring sanitation and modifying heat and moisture; its equable and rela-

tively cool climate tempered by the aseptic and antiseptic ocean air, and influenced by the antiseptic emanations of its pine forest; its low relative humidity; its large amount of sunshine; its pure water supply—that it is the only considerable portion of the Atlantic coast entirely surrounded by water—that it is a pier with all these natural advantages extending one hundred miles into the Atlantic Ocean and attached to the greatest city in America; when medical men become familiar with all this, Long Island will reach its manifest destiny, and become one great health resort.

AN ATMOSPHERIC EDDY.

It was several years ago discovered, and subsequently confirmed by the United States Weather Bureau, that a belt some 200 miles wide lies between the Piedmont Plateau and the ocean, in North Carolina, and approximately within the 76th and 80th meridians, which is but little affected by violent atmospheric pressures. It is in an almost constant state of quiescence, the air currents seldom exceeding a breeze lusty enough to detach dead limbs from superannuated trees. The storms which sweep up from the Caribbean Sea in the hurricane months give it but a comparatively mild shock, while the cyclones which hurtle from the Rocky Mountain areas leave it practically immune. Just as eddies form in the bends of sinuous water-courses, so an atmospheric eddy forms in the elbow of Cape Hatteras. Precipitation of rain and snow is ample, but never excessive; the temperature is modified by cooling intervals; purest of water flows from the foot hills; sub-tropical vegetation—the palmetto and cactus—hobnob with the boreal junipers and pines. Sanitarians have hastened to utilize these climatic advantages in the interest of invalids and patients, and more than one Pinehurst spreads out its beneficence over favored locations of this peculiar area. A recent statement declared that these resorts cannot accommodate one-half the annual applicants.

Combining all these sanitary advantages, and supplemented by most charming environment of woods, hills and water spaces, Fayetteville, in Cumberland County, stands conspicuous and ever attractive. It is on the direct railway thoroughfare between Florida and northern cities, and makes a delightful half-way house

for such as elect to tarry on their way. For thirteen years I have made some portion of this phenomenal atmospheric eddy my place of winter residence, after testing all the resorts between Norfolk and the Rio Grande, with comparison in favor, all told, of Fayetteville. My temperature record for the month of January, systematically kept, shows fifteen days clear, seven cloudy and nine partly clear, with an average day temperature of 42 degrees. Nights are apt to be cold, with the mercury frequently at freezing point, but this does not interfere with lettuce and jonquil culture, under cloth. Fluctuations are most variable. For example, on January 2d the thermometer on a northern exposure showed 60 degrees, and on a southern exposure, 70 degrees. Peep frogs were heard that day, and sweet-gum buds were as large as pecan nuts. On the 10th the mercury showed 10 degrees for a minimum; on the 22d, 65 degrees as a maximum. Four consecutive days, 28th to 31st, showed snow and sleet, which two succeeding warm days carried away. On February 4th jonquils in gardens seemed ready to bloom, but were retarded by a succeeding cold spell, lasting five days, with a minimum temperature of 24 degrees and a maximum of 42 degrees. One intervening day showed 65 degrees. Up to the 12th we had five days clear, and seven partly clear. The ground-hog disclaims all responsibility.

CHARLES HALLOCK, M. A., *Observer.*

THE PREVENTION OF TUBERCULOSIS.*

By WILLIAM TIBBLES, LL.D., M.D., L.R.C.P., M.R.C.S., L.G.A.,
Medical Officer of Health, Nottingham, England.

Phthisical people about to marry should be warned of the risk that their offspring may develop the disease. Even if the individuals themselves be free from the disease, their children may develop it, if the stock be phthisical. Scrofulous, tuberculous and superannuated people ought not to be married, or should not, at any rate, become progenitors; healthy, vigorous individuals should not marry cousins or their near relatives; all such alliances

*Written for and Reprinted from "The Detroit Medical Journal," January, 1904.

are likely to end in the production of children of the scrofulous or tubercular diathesis, with a strong tendency for the development of consumption.

Children born of phthisical parents should be subjected to the same rules of life as a person who exhibits the early signs of the disease, so far as they can be enforced. This is the means of eradicating the inherited tendency to the disease; by fitting their tissues to resist the invasion by *bacilli tuberculosis;* or, rather unfitting them for the development therein of these bacilli.

Tuberculous mothers should not suckle their young; nor should their children be brought up by hand, if this can be avoided. The best means of fitting the infant for resisting the disease in its many forms, for warding off marasmus, tubercular meningitis, struma, scrofula, and diseases of the bones and joints, is to provide it with a good wet-nurse. The practice of providing motherless infants, or the infant of a delicate woman, with a wet-nurse has fallen into desuetude, as other modes of feeding have become fashionable. This is unfortunate, for thousands of children now die or become the subjects of tuberculous diseases, owing to their being bottle-fed, who might escape these troubles if they had the milk of a good healthy woman. The practice is old-fashioned and there are some arguments against it; but the greatest and most persuasive argument with most people is its expense. A wet-nurse should be subjected to a medical examination; she must not be of a phthisical family, nor have any taint of this or any other constitutional or communicable disease.

If the child must be fed by hand, it should have the fresh milk of the cow, goat, ewe or ass, modified to approximate mothers' milk chemically. From six to twelve months of age, the child may have, in addition to milk, a little beef-tea or clear soup, egg or custard; or some of the milk may be thickened with one of the patent foods, or with baked flour, arrowroot or bread. From one to two years of age, porridge should be given for breakfast; the juice of meat, gravy, or clear soup for dinner, the rest of the food consisting of milk and milky foods. After teething is over, the child may have a little finely cut meat once or twice a day, and some bread and butter in addition to the other articles. Milk must still be given liberally for a long time, and the amount the child takes at meals should be mostly drunk first; after this, he may have as much bread and butter or potato, meat, or gravy, as he reasonably wants. The child's bread should not be soaked in milk or gravy; he should chew it so that it may be intimately

mixed with the saliva, whereby its starchy ingredients are converted into sugar, and more easily digested. But milk may be given freely while the child is eating bread, between each mouthful or two, for more will be drunk so than otherwise.

In childhood, the disease is promoted by every condition incompatible with health to which the system is exposed. The body must therefore be fortified against it by good food and hygienic management. In this period the diet should consist of plenty of meat, soup, eggs and milk, with a fair amount of bread, potato and farinaceous puddings; potatoes should not be taken to the exclusion of other things, but in moderation they are valuable for their starch, and the salts which give them their anti-scorbutic properties. Oatmeal and lentils are valuable, as in addition to their proteid and carbohydrate elements, they are rich in iron and phosphates. It often happens as soon as a child shows signs of tubercular glands, or other such trouble, he is deprived of all bread and potato and dosed freely with cod-liver oil, as though the latter could entirely replace the former, to the patient's great and lasting benefit. Bread and potatoes are not the cause of the deterioration of the organism, nor should they be stopped from the dietary, except in so far as they are replaced by meat, milk, eggs and other nitrogenous foods. It was formerly thought that a diet of bread and potatoes favors the development of the tubercle; and perhaps they do, but only because the diet contains an insufficiency of proteid material; therefore, do not cut them off entirely, but add more nitrogenous food to the diet, as already indicated.

The importance of an abundance of fresh air and muscular exercise for children cannot be too much impressed on parents as preventive measures; it is useless to modify the diet and dose the child with cod-liver oil, if, at the same time, it is allowed to sit all day long in a close room or crowded schoolroom. The schoolroom must be well ventilated, the school hours not too long, and long evening studies must not be allowed. There must be plenty of out-door exercise in gymnastics, or at least with hoop, skipping-rope or shuttlecock and battledore. The great mischief is that girls give up their exercise too early in life; almost before puberty comes upon them they consider it unwomanly to exercise in this manner; but, as they become too old for their childish games, they must be encouraged to continue to exercise in the open air by a reasonable amount of hockey, tennis, cricket, cycling or riding, along with their brothers, to whom this exercise is

equally a necessity. Indeed, to be successful in our object we must definitely prescribe the amount of food and drink, the number of hours to be allotted to lessons, to play and exercise, and to sleep.

There is no remedy which has so well-established a reputation as cod-liver oil, both in the prevention and treatment of phthisis; and there is no remedy which has been more abused. It must be remembered that it is not *every child* of tubercular habit or phthisical descent which is benefited by cod-liver oil. Physicians are taught by daily experience that instances occur in which a child having a bunch of enlarged glands, and a scrofulous appearance, derives no benefit whatever from it, but is made worse owing to gastric digestion having been upset, and to that distaste for fat which is so often the harbinger of phthisis. As a general rule, the child which is thick-set, plump, clumsy, lethargic or of slow mental activity is not benefited by it, even though there are enlarged glands and other signs of deterioration of the organism. But the children most benefited by it are those who are dark-haired, thin and slender, with a delicate skin which shows the veins meandering beneath it, and a general ethereal appearance; usually they have an acclerated pulse, are quick, sharp, of great mental activity and excitable nature; these are the children that require cod-liver oil and derive great improvement from it. To them it must be administered for months to get really good results; the dose should be small at the beginning and gradually increased to three or four teaspoonfuls daily. The disgust for the oil is soon overcome; children cease to fight against it, and even ask for their customary dose. It is advisable to leave it off now and then for a week or so, otherwise we may induce an unconquerable aversion to it. There are various emulsions, and mixtures with malt extract, which are more palatable than the plain oil; some of these are especially useful; but it must not be overlooked that the oil is diluted to the extent of the articles mixed with it, and therefore a larger dose must be given.

Baths are very beneficial in these cases, and it so happens that the children who cannot take the cod-liver oil with advantage are the very ones who are the most benefited by bathing, and *vice versa*. Ordinary plain baths have cured many cases of struma and considerably improved the tone of children with tubercular tendencies; but the medicated water baths, such as sea-water, brine-baths, bromo-iodine and sulphurous waters, are better. Such baths are really valuable in these cases, and the waters con-

taining these elements are justly esteemed as alteratives and promoters of metabolism; indeed, they enjoy a reputation as great as that of cod-liver oil, both for internal and external use. Where circumstances do not admit of removal to the source of the water, brine-baths and seabaths can be used at home. The bath may be taken at almost any temperature between 60° to 64° (cold baths) and 100° (hot baths); but from personal experience I consider that nearly cold bathing does the most good.

Phthisical persons, and those of strong phthisical tendencies, should not marry. Phthisical persons should not occupy the same bed or bedroom with a healthy person. There are very strong grounds for belief that this disease is thus transmitted from husband to wife, and that those who continually nurse tuberculous patients sometimes become infected. Simple contact or occasionally visiting such patients is devoid of danger, as is shown by the daily experience of medical men, especially of the resident medical men and nurses in hospitals devoted to the treatment of the disease.

A predisposition to consumption was formerly believed to be shown by certain characteristics of the diathesis, of which there are two types:—(a) The dark, beautiful person, of sharp mental activity, nervous and usually thin—the tubercular type; and (b) The fair, coarse-skinned, muddy-looking individual, rather fat, clumsy, and of slow mental activity—the scrofulous type. Undoubtedly these types represent a delicate organization of the body, with tissues little able to resist the invasion of the *bacilli tuberculosis,* but a large number of phthisical people could not be classed with either of these groups.

Persons of known phthisical tendency or parentage should be especially protected from the precursors of the disease, which have so often been observed in these cases, and may be called the predisposing causes. Among these we have to reckon:

(a). *Wet and Damp.* Such individuals must avoid frequent exposure to wet and damp, which lowers the vitality and predisposes to many diseases. It is especially a combination of cold and damp that is the worst. There is an undue proportion of deaths from phthisis among people who live on damp, or imperfectly drained or made-up soil. Where a choice of site is possible, delicate individuals must live in a good, healthy district, with healthy surroundings and all sanitary conveniences. It is believed that a sub-soil of sand or gravel is the driest and therefore

the healthiest, and this is true, in the main. The situation must therefore be elevated and on a gentle slope, to favor natural drainage, both in surface and in sub-soil. Clay sub-soil makes the house cold and damp by retaining dampness; chalk, on the other hand, is usually dry, but cold because it does not absorb much heat; and made-ground must be avoided always.

There is a common belief that repeated colds are a cause of phthisis. The fact is that many persons with a predisposition to phthisis are frequently the subjects of catarrh. It is therefore highly important that such persons should avoid "catching cold." There is little doubt that a prolonged bronchial catarrh, a catarrhal pneumonia, whooping-cough or even measles will lower the resistance of the lungs, and so lead with other favoring conditions to the deposition of tubercles.

(b). *Deficiency of Animal Food.* An absence of a due proportion of meat from the diet is one of the most prolific sources of ill-health, and in combination with over-work, worry, and other such things, is a frequent predisposing cause of phthisis. On the other hand, high feeding is a grand means of fortifying the system against the invasion by it of the *bacillus tuberculosis.* In a person of phthisical stock or even with a known tendency to phthisis, the feeding should be carried out on the lines indicated upon feeding in consumption which follow.

(c). *The purity of the surrounding air* is a matter of nearly as great importance as the food. Overcrowding, working in close and ill-ventilated rooms, or with the fumes of gas, etc., frequently co-operates with the foregoing as a cause of phthisis. The dust arising from the material in the workroom may produce the bronchial catarrh or the catarrhal pneumonia which is the forerunner of phthisis. In many trade-processes, gases of an injurious character are evolved and escape into the air which must be breathed by the workpeople engaged therein; but the vast majority of trades are injurious or otherwise in proportion to the amount and kind of dust produced. The long-continued inhalation of dust produces diseases of the respiratory organs, especially bronchitis and emphysema, interstitial pneumonia and fibroid phthisis. A table showing the mortality from all causes among males engaged in dusty occupations in England and Wales may be taken at 1,000; of this, 200 are due to tubercular consumption and 182 to other diseases of the lungs. This can be taken as a proof that pure air, well-ventilated rooms and plenty

of space are as necessary as good food; and that the avoidance of impure air, bad ventilation and overcrowding are all-important in the prevention of disease. Besides this, the bacilli of the disease have been obtained from the floors and walls, both of houses and workshops, occupied by consumptive people; these must, therefore, be inhaled with the dust.

(d). *Exhausting discharges,* prolonged suckling of infants and frequent child-bearing are among the well-known precursors of consumption among women, and most certainly require attention.

(e). *Any condition which lowers vitality* predisposes to consumption, and renders a delicate person liable to its invasion; among these we must reckon excessive indulgence in alcohol, sexual excess, syphilis, and all other exhausting diseases.

(f). *The milk of cows* for domestic purposes should be boiled. It is an animal food, and for that reason alone it ought to be cooked, but this is also necessary for protection against any chance infection by many diseases; for there are several which can be transmitted to human beings, and it is believed that among them we must reckon bovine tuberculosis. Stall-fed cows are very susceptible to tubercle. It is stated that 25 per cent. of cows kept in town are the subjects of this disease, and even the best bred are liable to it. The milk may not contain it in the glands; but there may be ulcers upon the udders, the discharge from which, laden with bacilli, becomes disseminated in the milk. It is argued that if cow's milk causes tuberculosis in human beings, the disease ought to commence in the bowels rather than in the lungs. Probably a large proportion of the cases of tubercle of the abdominal glands (*Tabes mesenterica*) are due to this cause; but it does not follow that the abdomen must always be the primary seat of the disease, when the infection arises from milk. The disease may begin in the abdomen, brain or lungs, or, avoiding these, the primary seat may be in a bone or joint. *It still remains to be proven that the milk of tuberculous cows does not cause tuberculosis in human beings.* The bacilli in man and cow are identical in appearance, and it has been clearly proved that rabbits, dogs, guinea-pigs, etc., fed with tuberculous cows' milk will become tubercular, and if the disease is thus transmitted in animals, why not in children? Indeed, there is strong evidence that it is so transmissible; and further support to this idea is given by the fact that the percentage of children under five years of age

who die from tubercular meningitis, ulceration of the bowels and tabes mesenterica is very high.

(g). *The pet animals* of children—guinea-pigs, young dogs and kittens, white mice, rabbits, etc., are prone to such diseases, and may possibly communicate tubercle to their friends, the children who play with them; therefore, all weakly or sickly animals of this class ought to be destroyed without reserve.

(h). *The flesh of animals* is capable of transmitting certain diseases to man, including phthisis and tubercle; and although these diseases arise more commonly in other ways, it must not be forgotten that such transmission is possible, and that such an origin would be far more common, were it not for precautions taken to prevent the sale of unsound meat, and the additional safeguard in thoroughly cooking all kinds of animal food.

(i). *Not the least danger of infection arises from a person suffering with the disease,* and certain precautions are necessary to prevent his spreading the disease to others. The researches of science show that the patient's breath does not contain the bacilli, but that the phlegm or sputum may be loaded with them. If the patient spits upon the floor anywhere and the sputum is allowed to become dry, particles of dust are formed which float about in the air and carry germs with them, so that the air of a room or other place may become sufficiently impregnated as to be positively dangerous to a healthy person, to say nothing of one who has a predisposition to the disease. The floors, walls and furniture of rooms occupied by phthisical patients become infected by germs; indeed, the bacilli have been collected from such sources and experimental inoculation of animals has produced the disease in them. Such experiments explain the frequent occurrence of the disease in a particular house, among the employees of a particular warehouse, manufactory, barracks, or public institution. From these conditions we learn the following means of preventing the spreading of this disease:

Let Proper Care Be Taken of the Sputa. Just as a consumptive must not swallow his phlegm, because it might be the means of spreading the disease to other organs in his body, so must he be careful not to be the means of distributing the disease to other people by it. Proper spit-boxes, spittoons or cuspidors must be used; they should contain a 5 per cent. solution of carbolic acid or other similar disinfectant. They should be capable of further disinfection by boiling or cleansing with a solution of bichloride

of mercury. The patient must avoid spitting except into such receptacles as are described, or small pieces of rag or paper containing disinfectants.

The rooms used by a consumptive must be thoroughly ventilated. There is little doubt that frequent changing of air dilutes the poison, diminishes the number of germs and minimizes the risk of infection from this source.

The clothing, especially the underclothing and the bed-linen, of the patient should be boiled, or at any rate scalded, when being washed.

Thoroughly cleansing the rooms occupied by the patient is also of importance; so that an occasional "spring cleaning" is imperative, disinfectants being used in the process. When a person has died from this disease, the rooms must be disinfected with sulphur or formalin; the paper should be stripped off the walls and burned; the ceilings and cornices must be limewashed, and all wood-work, including floors, should be washed in a solution of carbolic acid, or with carbolic soap.

Pre-phthisis. In all these cases of consumption there is a stage which may be called *pre-phthisis,* in which, before the deposition of tubercle in the organs, there are signs of deficiency and weakness, with some deterioration of the blood, due to anæmia. In these patients, a course of ferruginous preparations and waters is strongly advised. Such persons must exercise unusual care to avoid all risks of "catching cold," by wearing flannel next the skin. Sudden chilling of the skin is not followed by sickness in all cases, but undoubted examples occur to all physicians, in which the signs of consumption made their appearance at no very long date after a severe chilling or unusual wetting of the skin. One must be quite sure that the catarrhal products in pneumonia are quite dried up, or pleurisy quite cured, before the patient is allowed to return to business, to school, or even to take exercise in the open air. In such conditions the inflammatory products frequently become degenerated and form an exceedingly suitable nidus for the growth of the tubercle bacillus.

Rest and Change of Air. In the stage of pre-phthisis and in the early stage of consumption, patients who have the means ought, above all things, to throw up their positions in counting-house, office, or warehouse, to avoid the overheated, dust-laden atmosphere, even to avoid heated and tobacco-laden club rooms. For, though the exposure of a person with a delicate chest to these

d influences may prove injurious to a weak lung and end in nsumption, the disease is often promptly arrested and brought a favorable issue by their careful avoidance. The patient must move to a district with pure air; avoid work and worry, and ad a quiet life, the beneficial effect of change of air being equally arked in the working classes. The object is to obtain a pure, acing air for many hours daily, without the risk of "catching ld," and without undue strain on the lungs. This may be obined by a sea voyage of long duration; residence in certain disicts of Colorado, California, the Cape of Good Hope, or New aland, or at high altitudes in the Alps of Switzerland. The ace should be chosen according to the time of the year, one ace being better for summer and another for winter. In less vorable climates there are many especially constructed sanaria, in which an out-door life is adopted; in this open-air treatent, the patients live as much as possible in verandahs or sumerhouses, open to the air, but so constructed that the patients an be protected from wind or wet; this treatment has been escially marked with success in cases of non-feverish phthisis, in ombination with overfeeding.

Want of appetite, indigestion, nausea and vomiting are unpleasnt symptoms of common occurrence in these early cases and luring the course of phthisis; indeed, a catarrh of the stomach, with a distaste for fatty food and a very capricious appetite, are marks of the individual of strumous or tuberculous type, even before physical signs of the disease appear. Due attention must therefore be paid to it; the stomach must be coaxed, indulged to some extent, and medicines given to aid its recovery, promote appetite and encourage the alimentary secretions.

Loss of Flesh and Strength is the Rule. Emaciation is one of the earliest symptoms and may be taken as a note of warning, when a cough of unusual duration has been thought to be due to a simple catarrh, or to be of pharyngeal or gastric origin. This sign must be met by overfeeding. These patients require the richest diet that will agree with them. All food is proper that contains fat or fat-generating and flesh-forming elements; therefore ***milk*** cannot be taken too abundantly. From four to eight pints a day may be taken. The milk of animals which feed on mountain pastures, as that of ewes or goats, is richer in flesh and fat-forming substances than cow's milk, and is therefore commendable as a *milk cure* when patients are within reach of it; but when patients cannot travel to obtain it, they must carry out

the milk-cure at home, with cow's milk. *Plenty of animal food* is required, as beef, mutton, lamb, *liver, spleen, sweetbread and kidneys,* fat ham and bacon, game, poultry and eggs. Most kinds of *fish* may be taken, and oysters, either raw or cooked, also *soups* of beef, mutton, chicken or game, which may advantageously be thickened with rye-meal, lentils, pea-flour, bean-meal, barley-meal or rice, and flavored with tomato, celery, onion, etc.; and all kinds of meat essences are valuable.

Puddings, mostly of milk, eggs, with farinaceous substances like oatmeal, hominy, rice, sago, tapioca, vermicelli, macaroni; custards, jellies, trifle, cream.

Vegetables: Potato, cabbage, spinach, onions, asparagus, celery, water-cress, lettuce, tomato, beet, parsnip. *Fruit:* Grapes, which contain 25 per cent. of sugar; strawberries, apples, dates, prunes, figs, bananas, melons, and all sweet fruits. *The drink* should be chiefly of fresh milk alone, or with tea, coffee, chocolate, buttermilk, whey; pure water; bitter ale or stout, Bordeaux, Burgundy, wines containing iron, and all sweet wines. Stimulants are not vitally necessary in early cases, and must by no means be allowed to upset digestion. There must be four good meals a day, about four hours apart; the patient should also have milk, milk and raw egg, or custard at least once between the meals, and in the night, if the patient awakes. We must insist that the food is as rich as possible in nutriment, and yet as plain in the cooking as is compatible therewith, easy of digestion and abundant. Fats and carbohydrates are as important as proteid food. Whole wheat bread is better than white, if it does not irritate the stomach. Oatmeal and maize are valuable, as they contain much fat; lentils, much phosphates and iron; bean or peameal, much albumin; and all green portions of plants, which contain iron and valuable salts. Milk contains all the elements required in the body, but is deficient in iron. Cream can be taken by many persons who are unable to take cod-liver oil; it can be given abundantly in tea or coffee, with fruit, or added to other milk, or made palatable by the addition of a teaspoonful of brandy or sal volatile. Milk can also be increased in fat by boiling finely shredded *suet* in it. Other persons who object to fat meat may be able to take a larger quantity of butter, which contains the same fatty acids as beef and mutton fat, but less of *stearin* and more of *olein;* it appears to be the stearoptene or stearin in meat which is objectionable to patients. Clotted cream or cream cheese are nearly the same as

butter, consisting mainly of condensed cream. *Cod-liver oil* consists chiefly of *olein,* the liquid fat, together with some margarine, palmitin and stearin, and about 5 per cent. of *free acids* which aid in the digestion of the others. Cod-liver oil is commendable as a fat which is easily digested by patients, and is a valuable alterative by virtue of traces of iodine and bromine which it contains; but we must not impress ourselves with the idea that it *cannot be done without;* it increases the richness of the chyle, improves the quality of the blood, but differs from almond or olive oil only in its free acids and salts, and in containing less palmitin and stearin than the fat of butter and meat. We must ascertain that our patients can digest cod-liver oil, and it is contraindicated in gastric catarrh, diarrhea or hæmoptysis; for its alterative effect it must be taken for months together, and this effect is quite secondary to its action as a food.

Another important matter is the digestion of carbo-hydrate food. In many cases the secretions are defective in amylolytic ferments, and in consequence amylaceous foods, starches in particular, are but feebly acted upon. There is no more suitable remedy for this trouble than *extract of malt.* This consists of malt sugar, with some dextrine, albumin and the soluble phosphates of the barley; it is both directly and indirectly nutritive. The sugar or maltose does not give rise to acidity and dyspepsia, like sweets containing cane-sugar; its albuminous constituents are flesh-forming, its phosphates and salts enrich the blood; but above all, it contains among its albuminoids an active ferment, *diastase,* which acts powerfully upon starch in bread and other foods, and converts it into sugar—good specimens of the extract will convert several times their bulk of starch into sugar. Diastase is most active in an alkaline medium; it is therefore better that the extract be mixed in some warm gruel or other farinaceous food, and given just before a meal, or that it be not given until about two hours after the meal, when the acid of the stomach is becoming exhausted. It is often made the vehicle for administering cod-liver oil.

Exercise in the open air must be enjoined in all these cases, care being taken to stop short of fatigue. Probably *walking* is the best; the respiratory and cardiac activity, as well as that of the general muscular system, is increased by it. Riding and cycling may be indulged in; breathing exercises and singing are valuable to a certain degree, as are also gymnastic exercises for the development of the chest. Moderation must be strongly urged, and everything

in the way of a strain must be avoided; great efforts in running cycling, riding, dancing and singing are equally debarred, or we shall surely produce an attack of hæmoptysis, bronchial catarrh or such a physical exhaustion as is a prelude to the deposition or extension of tubercle.

The Anæmia. Oxygen is necessary for life, and the red corpuscle is the element that carries it all over the body. The less oxygen in the blood, the more powerful are the demands for greater activity in the lungs, hence quickened breathing and dyspnœa. Anæmia is the rule from the earliest stages of tuberculosis, and is due to loss of nutrition. The skin becomes pale and waxy-looking, the mucous membranes pale, the conjunctiva of a pearly lustre; the breathing is quick and more or less difficult on exertion, and there is palpitation, with spots before the eyes, ringing in the ears, or faintness. Amenorrhea is not uncommon. The treatment is largely by animal food, *red* meat, raw meat-juice, red marrow and its preparations, defibrinated blood, spleen-pulp, liver, eggs raw and cooked; oatmeal and lentils, for their iron and phosphates; green vegetables, for their iron-bearing chlorophyll and their salts. It is useless to attempt to *force* the menses; but such drugs as iron, myrrh and aloes, which act very largely by improving the blood and general nutrition, and keeping the bowels clear, may bring about the desired period.

Pyrexia may or may not be present from early days; its presence or absence bears some relation to the activity or otherwise of the disease. When it occurs only occasionally, a few days' rest in bed until it has subsided is the best treatment, or combined with quinine and an acid. Such patients are not the best for *open-air treatment,* nor do they stand long journeys, even for their health, very well. Pyrexial cases must not be exposed to all weathers, for they run the greatest risk of catarrh and consequent invasion of fresh tissue during the attack.

The mental condition of these patients is usually one of great hopefulness or great confidence in their power of recuperation: even when very ill in bed, they believe in their speedy recovery if only they could get rid of their cough.

Finally, our chief reliance is upon the improvement of the body and its tissues in every possible way, so that it may be enabled to resist the inroads of the disease. This indication is best met by pure air, perfect hygienic surroundings, sufficient exercise and abundance of good food.

Nottingham, England.

DIETETIC TREATMENT OF CHRONIC NEPHRITIS.*

By VICTOR C. VAUGHAN, M.D., Ann Harbor, Mich.

The most reasonable hope of doing this lies in making a radical change in the proteids of the food.

Before going into this, however, I wish to make some brief statements concerning the employment of medicinal agents in chronic nephritis. I am led to do this for fear that it may be thought that I would discard all drugs as valueless, and this is far from my opinion. No one of experience can deny the value of digitalis in passive hyperemia of the kidney due to disease of the heart, and which is often accompanied by albuminuria and more or less extensive dropsy. Indeed, these are the cases of so-called Bright's disease that are so satisfactorily treated by the proper administration of heart tonics, the best of which, so far as these cases are concerned, is, in my experience, digitalis. Neither can one of experience deny that great and more or less lasting good is secured by the administration of hydragogue cathartics, such as elaterium. Under the proper employment of this drug and the subsequent use of heart tonics, I have seen extensive edemas of the lower extremities wholly disappear, and the patient able to return to his work and continue at it for years. Furthermore, the value of mercury in syphilitic diseases of the kidney and the benefit of quinine in malarial nephritis cannot be questioned. We must always strive in the treatment of any disease to find the causative agent, and direct our treatment accordingly. It is true that we may empirically discover a cure while the cause remains unknown, as has happened in the treatment of both malaria and syphilis, but happy hits of this kind are not to be expected to occur with any great frequency. However, just this thing has, if I may express it, partially happened in the dietetic treatment of chronic nephritis, inasmuch as the milk diet in this disease was tried with more or less success long before we knew anything of the differences between the proteids of milk and those of meat.

Clinicians generally recognize the importance of diet in chronic

*Abstract of paper read at meeting of the Washington State Medical Association, Spokane, September, 1903.

nephritis, and much has been written on this subject. Thus, Pel says: "The question, what diet shall we prescribe for our patients with kidney disease, is of great practical importance, because I know of no organic disease in which the manner of life and food so largely influences the course of the disease as in chronic nephritis." And still there is the greatest difference of opinion among these same clinicians when it comes to the point of saying just what foods shall be prohibited and what allowed. It may not be amiss to briefly refer to some of these differences. As a rule there is agreement that a meat diet is harmful, and yet at least one writer recommends an exclusive meat diet, but this is so generally condemned that we may overlook it altogether. Some of our most recent authorities lay but little stress upon the desirability of restricting meat, or omit mention of it altogether. In discussing the treatment of what he calls chronic productive nephritis (intestinal nephritis), Delafield says: "As regards the diet, the quantity of sugars and starches taken should be restricted, and the ingestion of fats encouraged. The use of wine, spirits and tobacco should be discontinued," and this is all he has to say about diet in the treatment of this form of nephritis. Under the head of chronic productive nephritis with exudation (parenchymatous nephritis) he is even more brief, for he contents himself with the following: "For the nephritis the patient should be kept in bed and placed on a fluid diet." Under the treatment of chronic parenchymatous nephritis, Osler gives one sentence to diet, and this reads as follows: "Milk or buttermilk should constitute the chief article of food," and under interstitial nephritis he says: "The diet should be light and nourishing, and the patient should be warned not to eat excessively, and not to take meat more than once a day. Care in food and drink is probably the most important element in the treatment of these early cases."

All have heard of the interdiction of dark meats, but von Noorden claims that the distinction between light and dark meats, so far as they affect the kidney, is a myth. Fish is condemned by Bouchard on the ground that it contains toxins and increases the toxicity of the urine, but is permitted as a substitute for beef by Klemperer, while Pel thinks that we should distinguish between the kinds of fish, and sees no reason for the exclusion of easily digested species from the dietary of the nephritic. Ortner forbids every part of the calf except the sweetbreads and the brain, while Kolisch thinks these the very organs that should be excluded on account of their large nuclein content. There seems

to be a general condemnation of game, even when the flesh of domesticated animals is permitted either with or without restriction. Why the flesh of the quail, grouse or other wild bird should be so much more harmful to the renal cells than that of the barnyard fowl, no one, so far as I know, has attempted to explain. Probably the interdiction of game is due to an unconscious effect of the old theological dogma that whatever man enjoys is bad for him.

The differences of opinion about the placing of eggs on the menu of the chronic nephritic are quite as marked as those concerning meat. Early in his career as a clinician, Senator prohibited eggs because it has been shown that a more or less lasting albuminuria could be induced in experimental animals by the intravenous injection of solutions of egg-albumin, also that a like albuminuria might result in man by swallowing a large number of raw eggs, but in later years he has seen that his conclusions were hardly justified by the data, and now permits that article of diet in moderation. Oertel and others have found the eating of eggs in moderation may be granted to the nephritic.

The exclusive milk diet has been greatly lauded by some, and milk as an important article of food is not only generally permitted, but is prescribed. *"Le regime lacte absolu"* of the French has been probably more frequently prescribed and less frequently followed than any other diet prescribed in chronic Bright's disease. Generally, however, the prescription is given in the words of Dieulafoy, who says: "Follow the milk diet as absolutely as possible." It has been said that a pregnant woman who follows an absolute milk diet for weeks never has eclampsia. As to the truth of this statement, I cannot testify, because I never knew a pregnant woman to follow such a diet, but Pel states that he has known eclampsia to occur when the milk diet had been "very closely" followed. An exclusive milk diet has been in my experience an impossible thing to secure with nephritis, and, moreover, I do not believe that it is the best. Many clinicians have had a like experience so far as the difficulty in carrying out this régime is concerned, and some think that it is harmful in its effects.

On this point Pel makes the following statement: "This exclusive diet is not well borne by many, and disturbances in the functions of the stomach and intestines occur not infrequently. Everyone does not bear it well, and idiosyncrasies are seen. Moreover, we must not forget that on this diet one obtains too much

water, much phosphoric acid, much albumin, and too little iron for the needs of the organism. Not infrequently there is an undesirable increase in adipose tissue, and a decrease in hemoglobin, especially when the individual has a predilection for the accumulation of fat or toward anemia. Three litres of milk contain more than 100 grams of albumin, from which more than 30 grams of urea will be formed, and still we are cautioned against an excess of proteid. Furthermore, I think the amount of phosphoric acid, which varies from three to four grams daily, is harmful to the kidneys. Von Noorden suggests that the phosphoric acid may be partially eliminated by the addition of lime water, which forms an insoluble phosphate, and this is eliminated by the bowels. The deficiency of iron can be made good by the administration of medicinal preparations, but still the large amount of water may be harmful. To many patients with contracted kidneys, and whose blood pressure is high, whose vessels show the well-known changes, and who are already cachectic, the drinking of so much milk is directly harmful, for the blood pressure is further increased, the hydremia is intensified, and the diseased heart still further endangered. Still further, the increased water acts as an unnecessary and undesirable irritant upon the kidney, and especially upon the glomeruli. For these reasons the amount of milk taken daily should be limited to from one to one and one-half litres daily, especially in contracted kidney, and in those cases of parenchymatous nephritis where the amount of urine is small and the anasarca great; in these the dropsy will be increased because the water will not be eliminated, but will accumulate in the subcutaneous tissue." While I do not agree with all the statements in this quotation, I believe that the argument against an exclusive diet is well put. Pel concludes his argument in favor of a mixed diet, and on this point I certainly do not agree with him.

Passing on to the consideration of vegetable foods, we find the same differences among writers. Pel cautions us against those fruits and vegetables that contain benzoic acid, such as plums and green vegetables, but if anyone has shown that the small amount of benzoic acid found in the few plums that a patient would consume at a meal or in a day would be at all harmful, I am not aware of such a demonstration. Asparagus has been condemned, I suppose, because it imparts an odor to the urine. Certainly I know of no other reason for this interdiction. Certain vegetables have been condemned on account of their large potassium content, but as Pel states, it was formerly the custom

to give saltpetre in doses of half an ounce per day without any evidence of harmful action on the kidneys.

The diet which I have found most serviceable in chronic nephritis is, with the exception of cream and butter, wholly vegetables. I forbid meat in any and every form, eggs and milk. As I have already stated, the object which I desire to accomplish is to profoundly alter the proteids in the circulating blood, and both theoretically and clinically I believe that I have the best of reasons for the selection of this diet. The urine for twenty-four hours should be collected and the quantity of albumin in it should be accurately determined, and the result expressed both absolutely and in percentage. At the same time the amount of urea and of total nitrogen should be ascertained. Then the patient should be placed on the diet, and after three days or longer corresponding analyses should be made. The diet permits cream, which should be separated from the milk as completely as possible, and should not contain more than 1 per cent. of proteid, and the amount of cream allowed per day is limited to 500 grams, or one pint. Corn meal mush I prefer among the cereals, and this is allowed ad libitum, and oat meal or cracked wheat may be substituted. Sugar is allowed ad libitum for the mush, and Zwiebach and butter and potatoes complete the substantials of the ration, although I permit the legumins, peas and beans, either fresh or canned, green vegetables, fruits and melons. There is no difficulty in living on such a diet, and after a few weeks patients lose all desire for meat and eggs and wonder why they were formerly so fond of them. That the necessary calories are furnished by this is shown by the following table:

	Proteid.	Carbohydrate.	Fat.
500 grams of cream.....	5	27.60	150
200 grams corn meal.....	20	130.60	8
100 grams Zweibach.....	14	60.00	24
50 grams butter.....	..	.....	40
20 grams sugar.....	..	20.00	..
	39	238.20	222

This gives 39 grams of proteid, 238.2 grams of carbohydrate and 222 grams of fat. The caloric value of each gram of proteid and carbohydrate is 4.5 and of each gram of fat is 9; therefore

these calories represented in this ration are shown by the following figures:

39+238.2=277.2×4.5=	1274.4
222×9	1998.0
	3245.4

It will be seen that this ration furnishes more than 3,000 calories, and we have taken no account of fruits and melons. Furthermore, the proteids can be increased by substituting in part legumins for cereals, or by substituting oat meal or wheat for the corn meal. I have had hard-working men live on this diet with ease, and at the same time the amount of albumin in the urine has gradually decreased.

The proper thing to do in order to scientifically demonstrate the value of any diet in chronic nephritis wil be to test the relative toxicity of the blood serum of the patient on animals, with especial reference to its action on the kidneys of the animals, under different diets. This has not been done, but it offers a promising field of research to the young and enthusiastic student of pathology.

I regard the selection of a diet in chronic nephritis quite as important as it is in diabetes, and so far as my experience goes in the management of both of these diseases, diet is the most important thing. The digestive organs of the chronic nephritic need to be watched closely. Lavage of the stomach is often indicated, and an analysis of the gastric juice should be made in all cases. The bowels must be kept in good condition, but copious purgation, except during exacerbations, or for the removal of dropsical accumulations, or in threatened uremia, is not desirable or beneficial. I have already spoken of the value of elaterium and other hydragogues when free catharsis is needed.

The skin should be kept in a normal, but not too active, state. I think that the hot bath is in some cases given too frequently. Of course, one case gives no rules to govern the frequency of the hot bath, because so much depends upon the condition of the patient. As a rule I recommend the hot bath (temperature above 90° F.) two or three times a week, and a Turkish bath once a month. Flannel underclothing, medium to heavy in the winter and light in the summer, is prescribed, but I do not insist, as some do, that the patient should sleep between blankets in hot

weather. Blood counts and hemoglobin estimations furnish evidences that may be of value and should not be neglected.

The only reason that I have for writing this paper lies in what I have said concerning the nature of chronic nephritis, and its dietary treatment. On these points both my study and experience have led me to conclusions that differ from those held by others who have written upon the subject.—"Northwestern Medicine," September, 1903.

EQUAL TO THE OCCASION.—Jules Huret, the French journalist, who has announced that Americans make love too coldly, is the son of a rich merchant. M. Huret tells, in the Boston "Post," this story of his father's business acumen:

"My father, years ago, occupied a small shop on the ground floor of a large building. He was then at the beginning of his career, and his income was limited. He was, however, an economical man.

"A clothing firm occupied all of the building except the room held by father, and this firm had arranged with the proprietor that they should have that portion, too, whenever they were ready to pay the rental demanded.

"One day they decided to take in father's shop, and their manager accordingly called on him, and in a friendly way told him he had better look about for another stand at once, since his firm would soon be taking over the shop.

" 'But I don't want to move,' said father.

" 'Well, but you'll have to,' said the manager. 'You are a poor man, and my firm is rich. We can afford to pay three times as much rent for this floor as you can. Now, if you'll leave quietly, without making any fuss, we'll help you to find a new place. But, if you stay, you'll have to pay a rent that will beggar you—simply beggar you, remember.'

" 'Give me,' said father, humbly, 'two weeks to think this matter over.'

"' Well and good,' the manager replied, and two weeks later he called again. Father was all smiles as he received him.

" 'Everything, my friend, is arranged,' father said. 'You may stay here, as before. I don't pay any rent at all, but you pay 2,500 francs a year more than you paid last. I have bought the building.' "

THE REPORT OF THE COMMITTEE ON HYGIENE.

MEDICAL SOCIETY OF THE STATE OF NEW YORK,
January 26, 1904.*

In reviewing the events which have affected the public health in our State during the past year, your Committee observes that apparently a needless sacrifice of valuable lives has resulted from neglect of well-known methods for the prevention of the spread of acute infectious diseases. Much of the responsibility for this state of things must inevitably be borne by the medical profession of the State. It is not conceivable that physicians practicing their art under the present laws of our State are ignorant of the etiology, the mode of communication, and the methods of preventing the spread of infectious and contagious diseases. If not ignorant themselves it follows that either the profession has been remiss in the exercise of the highest functions of its calling, or that the people, and those who govern them, are not yet sufficiently acquainted with the demonstrated facts of scientific medicine, and are grossly neglectful of their duty. Because your Committee believes that both these factors are active in perpetuating the existing unsatisfactory conditions in the domain of public health, it desires to emphasize once more our duty as guardians of the public health and as instructors of the people in matters of hygiene.

Typhoid Fever.—It seems improbable that we will ever have more definite knowledge of the cause and methods for the control of typhoid fever than we have at the present moment. And yet the report of the State Commissioner of Health for 1903 shows that there were nearly 25,000 cases in our State, with a mortality of 1,635 cases. Typhoid fever is most largely communicated by contaminated drinking water. Our intelligent Governor called attention to this in his message of January 6, and referred to the passage, by the last Legislature, of Chapter 464 of the Laws of 1903, entitled, "An Act to Amend the Public Health Law Relating to the Discharge of Sewage and other Waste Matter into the Waters of the State," the enforcement of which is vested in the State Department of Health. It is needless to emphasize the importance of such legislation. It is well known that

*Advance Sheet from Transactions by courtesy of the Secretary.

all our public waters, including the beautiful Adirondack lakes, are infected. To restore them to a condition of purity your Committee recommends that every city and village and house sewering into public waters, which are used as sources of water supply, shall be compelled by law to purify the sewage, by acceptable methods, before it is discharged into public waters. A bill has been introduced by Senator Stewart, of Ithaca, which proposes to place the water supply and sewer systems of the State under the control of a State Board of Sewer and Water Commissioners, which is to be appointed by the Governor, and which is to consist of three men, one of whom must be a competent civil and hydraulic engineer, and another a competent bacteriologist. The bill appropriates $75,000 to carry out the provisions of the act. The intent of this bill is good in so far as it emphasizes the necessity for such work to be attended to in an energetic and scientific manner, and at once. The best method of accomplishing this desirable object is a legitimate subject for debate. If we, in our State, had a system by which men were especially educated in matters of public hygiene and were compelled to earn the degree of Doctor of Public Health before exercising the function of Health Officer or Health Commissioner in any community, there would be no necessity for the creation of such a commission. In a previous report this Committee, and our then President, Dr. H. R. Hopkins, called attention to the desirability of thus elevating the standard of service in the Department of Public Health. Instead of creating new boards it seems to your Committee that the time has arrived when the State should demand the most intelligent and active service from its various health officers, and should proceed at once to afford such as desire to enter that service an opportunity for special preparation in accordance with the method so successfully employed in England. In the meantime the object desired could be accomplished under the direction of the State Commissioner of Health by the addition to the funds at his disposal of a sum much less than that called for in this bill.

But of even greater importance than the purification of sewage, however valuable that may seem, is the perfect disinfection of all typhoid dejections before they are emptied into a sewer or privy or buried in the ground. For this the attending physician is directly responsible. The awful epidemic in Ithaca, and, indeed, all great epidemics, was directly due to the neglect of this very simple precaution. The false idea that frost kills typhoid germs must be intelligently combated, and the physician must

be as alert in seeing that all dejections are sterilized before disposal during the cold months as he is during warm weather. If all typhoid dejecta were sterilized before disposal this disease would be eliminated as absolutely and as quickly as has been yellow fever from Cuba under the energetic and intelligent direction of General Leonard Wood.

Tuberculosis.—The control of tuberculosis is less easily possible because of the nature of the disease. But the State and physicians have great responsibilities in this matter and can do much to forward the work by the early completion of the sanatorium in the Adirondacks for incipient tuberculosis, by the establishment in every community of a hospital for the tuberculous, and by the scientific care of those wards of the State who have developed tuberculosis while in public institutions for restraint or for treatment for special diseases, or in poorhouses. The antiquated buildings and unscientific housing of the dependent classes can no longer be tolerated by an awakened public conscience.

Smallpox.—The prevalence of smallpox in many communities this year is sufficient commentary on the laxity with which our good laws for the control of this disease are carried out. Such a state of things cannot exist in a vaccinated community. We must repeat the demonstration of Jenner of the value of vaccination. And we must insist that vaccination be performed by public officers with as great attention to surgical asepsis as is demanded in major operations. If life insurance companies including the industrial companies, would ask the date of the last successful vaccination, instead of "Have you been successfully vaccinated?" and refuse to issue policies except to those who show evidence of competent and recent vaccination, much help would be given. The re-vaccination of children after the age of puberty is neglected, and it is our duty to see that this is carried out systematically.

Because of the want of uniformity in the vaccine laws of different communities, and of the fraudulent certificates of vaccination issued by those opposed to vaccination, your Committee recommends that no child shall be admitted to any public or private or parochial school, until his scars have been examined by the public vaccinator, or other competent authority, and have been pronounced to be those of successful vaccination.

The State distributes diphtheria anti-toxin and anti-tetanic serum to those physicians who make requisition for it through

their local health officers. Your Committee recommends that under the direction of the State Department of Health, vaccine lymph is produced and distributed in the same manner, for it believes that in no other way can standardized and effective vaccine be uniformly supplied.

Tetanus.—The relation of tetanus to accidents with toy pistols and blank cartridges has been demonstrated in recent years to the satisfaction of all surgeons. This Society should give support to a measure to be introduced by Senator McCabe of Brooklyn, this winter, which prohibits the sale of blank cartridges to minors.

School Hygiene.—One of the most effective methods of educating the public as to the nature of infectious diseases and how they can be controlled is the teaching of the essential elements of this subject in our public schools. The medical inspection of public schools has been recognized throughout the land as of the greatest importance. Its primary aim is to aid in the control of the infectious diseases, and to safeguard the individual victim of physical conditions which interfere with his development from the harm which must inevitably follow. But possibly of greater value than the direct practical benefit to the individual, and to the community, resulting from the early detection of infectious diseases, or of crippling physical conditions, is the object lesson to both teachers and pupils of the importance of accurate observation of disease conditions. Your Committee recommends that physicians in every community urge the benefit of such inspection, and by every legitimate means try to secure competent medical inspection of every school in the State.

State Laboratory for Bacteriological Diagnosis.—In this connection it is fitting that the Committee gives its unhesitating support to the maintenance of the State Laboratory for Bacteriological Diagnosis. The practical value of such a laboratory to physicians practicing their art away from medical centers cannot be exaggerated.

Public Buildings and Tenements.—The recent holocaust in a Chicago theater has again called attention to the criminal neglect of public authorities in guarding the lives of the people in public buildings. Not only should the laws for protection from fire be stringently enforced in every community, but the equally important laws requiring sufficient air space and competent ventilation and plumbing in all buildings in which men and

women are employed or are permitted to congregate be looked after. There is no question but that a greater loss of health and life results annually from neglect of these requirements than is caused by such fires as that of the Iroquois Theater, though the result is not so dramatic. The constitutionality of the Tenement-House Act has been upheld by a decision of the Court of Appeals handed down on January 8, 1904. The provisions of this act should be extended by legislation to cities of the second and third classes, for in them, as in New York and Buffalo, the tenement-house problem is coming up, and must be met by energetic action at the start. Your Committee urges the utmost vigilance on the part of every member of this Society in maintaining what has already been accomplished for the better housing of the poor.

Child Labor.—Chapter 255 of the laws of 1903 amends the labor laws relative to the employment of women and children. The provisions of this law limit the hours of employment of women and of children between the ages of fourteen and sixteen, and prohibit the employment of children under fourteen in any establishment except during the summer vacation in cities of the third class. The provisions of this law are humane and right, and it is our duty as physicians to aid the Commissioners of Health in enforcing it.

Your committee in reiterating what is known to most of you, and what has been said often enough before, has no apology to make. It is only by constant repetition that we can keep before the public the importance of the subjects under our jurisdiction, and only by repeated recalls to our duty as citizens that we can disentangle ourselves from the engrossing cares of the daily routine of our lives.

JOHN F. HEFFRON,
JOSEPH D. CRARY,
D. V. STILL,
M. A. VEEDER,
JOHN H. PRYOR.

AN ALCOHOL SUBSTITUTE.—Alcohol, suitable as a substitute for ordinary alcohol, is obtainable, according to a German inventor, from fæces by submitting the fæces to dry distillation, absorbing the gases produced in water, and distilling the mixture thus obtained. The residues from this last distillation may be used as the medium for absorbing the gases.

SCHOOL HYGIENE AND THE NEED OF MEDICAL SUPERVISION IN ALL OUR SCHOOLS.*

By H. ERNEST SCHMID, M.D., White Plains, N. Y.

For more than a quarter of a century I have been closely identified with our free public schools, most of which time as president of the Board of Education.

I know we medical men are very apt to shirk all responsibilities outside of our professional work. This is altogether wrong. Physicians have duties toward the State just as other men have. I have always taken for my example as a citizen the late lamented Professor Virchow. The most industrious of scientific workers, he yet always found time to take a most active part in the political life of his country. But he always labored in that department in which his scientific knowledge would make him of most value. Where could we medical men then find ourselves of more use to the commonwealth than in the educational fields? And there our very professional attainments can be put to great advantage to the State. I say to the State, for the State's life depends on the evolution of our free public schools. A higher and higher state of education alone is a surety of the perpetuation of the free institutions under which we live. And a higher and higher educational development cannot be thought of without a more and more perfect teaching and enforcement of hygienic laws. To neglect the hygienic condition of the pupils is to neglect their mental growth and impair their future civic virtues. Civic virtues! This word always makes me swerve for a moment from whatever I may be considering, and deliver myself of a few words on the most important of all—obedience to the laws. Have you ever thought of the terrible fact that we are the most unlimited law-breakers in the world? We make no end of laws, and when they do not suit us we break them without the slightest hesitation. In my several official capacities, when I considered it my duty to enforce obedience to laws, I've been met with the utmost opposition, and been esteemed a personal enemy. Whence arises this moral defect? I am perfectly sure it comes

*Read at the Twentieth Annual Meeting of The New York State Medical Association, New York, October 19-22, 1903.—"New York State Journal of Medicine," January, 1904.

from the lamentable lack of enforcing obedience at home and in school, and lawless children make lawless citizens.

Unfortunately, many of our people confound liberty with license—think it manly in a boy to be uncontrollable and irreverent to his elders, and liberty-loving in a man when he breaks an inconvenient law. Gentlemen! If there be a bad law repeal it, but while it is in force keep it. Pardon this digression.

Therefore medical men should take upon themselves the duties of school board trustees whenever possible. Since a large proportion of the ill-health of a community is found in children of school age, it is very natural that we should inquire if perhaps this be due to defects in school hygiene, and if a large portion of it might not be prevented by improvement in that direction. Teachers and parents alike in many instances do not realize, for example, that the children's eyesight can be impaired, normal growth prevented, the blood poisoned and the body starved because of lack of knowledge of how schoolrooms should be arranged, and what hours should be devoted to study. For all these reasons I have endeavored to direct your attention to the great importance of school hygiene, as well as can be done in a short address like this. How important it is you will readily see. Everything, in fact, is of importance regarding the school, which exists for the greater elevation of the state of society and which can be assisted so essentially by the home, and will, in turn, educate the home. In the construction of its buildings and its administration the school should be supplied with and guided by whatever best and newest hygienic science has discovered in reference to it, and, as I said, but a moment ago, while the home can aid the school greatly, if desirous of doing so, sound hygienic teaching, in turn, can often reach the home far better and more quickly than in any other way, through the reflex influence of the school on the home. The people must come to the conviction that any educational plan which neglects the relation of mind and body in its hygienic and ethical import is to be rejected.

"Mens sana in corpore sano" is as true to-day as when it was first uttered. The preservation of health is an almighty factor in building up character. With these introductory remarks I desire to claim from you your serious attention to my words, no matter how far short they will fall from what they would want to effect.

The first to be considered is the selection of a proper site (hygienically proper) for a schoolhouse. The law in regard to it is not what it should be. In all places (with few exceptions in dis-

tricts where a special legislation has been enacted) it is chosen by a district meeting. It should be in the power of the boards of education. I have seen repeatedly district meetings packed by a certain party and a site voted and extravagantly paid for which was totally unfit for a school building. I have, therefore, succeeded in establishing a law by our State Legislature which empowers boards of education in villages of 5,000 or more inhabitants to select sites for new school buildings themselves.

A site should have perfect drainage capacity of the soil, which depends on whether it is of fine or coarse grain. This drainage capacity of the soil, of the lot, the amount of its slope and its nearness to streams, surface or underground, make the healthfulness of it. It must be so shaped by nature that it not only carries off easily refuse and excreta from within the building to be erected upon it, but also surface and rain water flowing over the ground. If it is not perfectly dry it should first be underdrained. If you look to all this and can say that no malarial influence can prevail there; that light, and with it cheerfulness, will be bound to reign within the house; that pure and plentiful water which cannot possibly be contaminated can be introduced into it and as easily removed from it, after having been used; that a proper system for removal of sewage exists within, as well as a perfect system of ventilation, carrying off all respiratory impurities, and that complete dryness of foundation walls and roof is found—then will you insure a healthy habitation.

I need not take up your time in telling you that the dampness from improperly constructed walls must have a bad effect upon the health of the inmates. I take for granted that this is all properly looked after by even a most ordinary set of trustees; but to the student of school hygiene there are many important matters which an ordinary builder, or even an architect, not conversant with school needs, will generally overlook; no, will often not know at all.

From the special investigations of physicians, architects and engineers the conclusion has been arrived at that the ideal classroom should be oblong in shape, and, if possible, 30 feet long, 25 feet wide and 13 feet high, with a seating capacity for 40 pupils. Such room would give to each pupil 18¾ square feet of floor space and 243¾ cubic feet of air space. Light should always come in at the side of the room (preferably the left side of the pupil) or the side and back. Now the dimensions of the room in length and breadth must be governed by the distance pupils can

see without straining the eye and also the distance they can hear clearly the words of the teacher.

It has been proposed to put more pupils into primary grade rooms, because the desks in them are naturally smaller, but this could not be done without danger to eyesight and hearing; the number of cubic feet of air space would be lessened for each child, which would mean so much less oxygen (the food of the child par excellence) for each.

In the above dimensions of an ideal classroom there would be found a good deal of space not occupied by desks, but this would be especially useful in primary schoolrooms for conducting different exercises. You must recall to mind this important need, that primary pupils must not be kept quietly seated more than one-third of the school hours. Smaller children do not only become restive and in that state illy attend to their tasks, but exercises of various kinds to call into play muscular activity are imperatively called for at that age for the sake of mental as well as physical development, and not altogether only for relief from fatigue of long-continued sitting. Have not all of us who are fortunate enough to be fathers of children observed how wonderful is the activity of the little ones? Could we grown men and women keep up with them during a whole day? Certainly not. But their nature demands this tireless activity. How terrible, then, would it be for these little ones, untrammeled in the day's wide-awake hours of activity, to be suddenly placed in a room and upon a seat for hours every school day, with no material change of position! It would make the school hateful in their eyes at once. Blessed, then, is the kindergarten, with its playful instruction! Have any of you ever visited and seen the doings there? If not, do so, and you will be astonished at the quickness of perception instilled there. Children, whose minds have received the first training of the power of observation there, can be traced all through the grades for brighter and quicker intelligences.

The best and most hygienic school desks are no guarantee against defective posture, ending in permanent disastrous distortion of the body, which was assumed from fatigue and inactivity.

Some of you may perhaps know that quite a controversy has been carried on regarding vertical and slanting handwriting. All manner of claims were made for the slanting kind, but all of them were made unmindful of the great question which should be answered before deciding for the one or the other. It is this: What

effect has the learning or exercising of the one or the other upon the health of the child? Then there can be but one answer: The learning of the slanting writing is most injurious to many children, for they must then assume a constantly strained position, which the vertical does not call for. I am perfectly aware that 75 per cent. of the pupils would not be hurt by it, being endowed with more vigorous frames, but 25 per cent. are always found among 100 children, in whom a deformity could readily be produced. This is a fact based upon statistics. Therefore, do not suffer any to say: "It did not hurt us when we went to school"—a narrow, selfish and thoughtless expression and unworthy the make-up of an intelligent person. But when one tries to be a reformer it is frequently expressed by the common multitude. Permit me to tell you, in relation to this statement, how a distinguished German investigator found that of 1,000 cases of curvature of the spine 564 developed it between the seventh and tenth years of their lives, which is at a time when with the beginning of the second dentition an increased growth of the whole skeleton takes place.

To continue the description of the ideal classroom I would say that according to the above authorities the window-sills should be 3½ feet from the floor and the windows extend up to the ceiling. The amount of glass space should be at least equal to one-fourth of the floor space, and better still one-third. The divided window shades, which come from both top and bottom of the windows, are to be excluded, and only those that roll from the bottom, that the light may come in from above and be more evenly diffused by striking the ceiling first. The walls should be painted, not calcimined, for obvious reasons, the best color being a greenish-gray. There should be plenty of space before the blackboards to give the children freedom of motion.

I come now to a very important matter, which is the proper treatment of the children's eyes and ears. Since sight is really the chief medium of education, it cannot be too carefully looked after, and yet it is a fact that myopia is most frequently (if not altogether) developed during school life, and this is because during that period of growth the eye is more liable to change in form, and children have much greater power of accommodation than adults, and hence hold objects more closely to the eyes. From this looking at objects so very closely they are called to look at the blackboard from their seats,

which calls forth a frequent change of accommodation. Next in importance is the hearing, which is likewise grievously tried.

The cloak-rooms or closets are apt to be in the most unsanitary condition, without ventilation and reeking with bad odors. In the same condition you may find the urinals and latrines.

I fear to weary you with further details, and yet they are all of decided importance. Nevertheless, all I have mentioned, in fact, the whole (may I call it so?) *physical* part of school hygiene shrinks into insignificance when compared with the *mental* hygiene of the school. I may not express myself altogether clearly, but you will see at once what I mean.

There exists a natural variation in the structure of the pupils and in their propensities and limitations. I am certain that teachers are not generally informed in this. Medical men, for this reason, should use every opportunity to impress this fact upon their constituents—this fact, that human beings differ in their capacity. The failure to recognize it unquestionably has led, in many instances, to insanity in the people concerned. Not a few alienists have expressed the belief that it really is one of the most fruitful causes of insanity. There is no question, in my own mind, that this is so, and that many, very many, cases of insanity can trace their origin to this period of development, during which the mental organism received an undue strain and the physical organization was illy looked after. I read only lately of a child, the daughter of a college president, who was an infant prodigy, who at the age of 13 years was such a Greek scholar that one of her teachers said, that were Hadley's Greek Grammar suddenly blotted out of existence this child could reproduce the whole of it from memory. She became insane and finally died in an insane asylum.

It is absolutely a matter of impossibility to find remedies for all the difficulties we meet. We do not have definite knowledge about the effect of education upon the brain cells. Donaldson asserts that the intensity with which any form of exercise is carried on during the growing period leaves its trace and the absence of it at the proper time is for the most part irremediable. Thus any lack of early experience may leave a spot permanently undeveloped in the central system—a condition of much significance, for each locality in the cerebrum is not only a place at which reactions, using the word in the narrow sense, may occur, but by way of it pass fibers having more distant connections, and its lack of development probably reduces the associate value of these also.

Oppenheim says: "One must keep in mind that the faculty which governs mathematical computation is located among the higher centers of the cerebrum; that this part of the brain is among the latest to attain maturity; that therefore in childhood it is in no condition to put to a strain. Whenever a scholar at this age is forced into attempts to use this faculty a process similar to any other sort of work results. One can the more easily understand the inevitable outcome from a knowledge of the fact that the nerve cells of children, being more or less in a state of unstable equilibrium, are easily exhausted, so that a consequent nerve poverty must show itself. Thus such children receive no permanent value from the studies in mathematics, simple though they be; and, what is more, if these studies were not begun until greater maturity—say at least 10 years of age—not only would a vast amount of nervous wear and tear be saved, but the children would also learn as much in one year as they formerly, under the present adverse conditions and methods, learn in five. The time thus saved might be profitably employed in strengthening both mind and body.

I fully coincide with this author. I am sure most of us, were we to examine our early records, would find some study which was most impossible for us to grasp, but which later years robbed of all its difficulties. As to mathematics there is no doubt about the true value of the above statement, and it only serves as another argument for intelligent medical supervision of all our public schools. And it is to this point I have been striving to come since I began my address to you. There should be a highly intelligent medical adviser in all our schools, looking after everything pertaining to physical and mental hygiene of the children, and also instructing the teachers in the psychology of that early period in life. Only then can a teacher be competent to teach so as to suit the capacity of a pupil. Only then will the important fact be brought into the clearest light, that the standard for teachers of the primary grades should be as high as the highest classes, because it will be understood that pupils in the primary departments can be much more, infinitely more, easily influenced for good or evil than in the advanced grades. Unsuitable tasks will produce much greater damage upon the more impressionable brain cells of the very young child than the older ones, whose cerebral substance is more fully developed. Finally, imitation being the great characteristic of the very young child, it needs all the more the best examples set by competent teachers.

This medical inspection of schools has been carried on in many cases with marked benefit. In Hungary the school physician devotes his whole time to the school. He studies and examines the school building from a sanitary standpoint, internally and externally. He investigates its surroundings, the air in each classroom, and analyzes it from time to time. He inspects the lighting, heating and ventilating of each classroom, and regulates the number of children in each. He makes yearly measurements and general examination of the children, and by this arranges for their seating; and this not only to adapt their size to the desks, but also with regard to special requirements of certain pupils of defective eyes and ears.

In London, England, a physician examined several thousand school children for the avowed purpose of seeing if he could detect any evidence of overstudy. He found that over 46 per cent. of the pupils were suffering from nervous headaches, and from his observation was able to prepare a strong argument in favor of reducing the mental pressure in schools.

New York City appointed (in 1897) 134 physicians to visit the schools. This number has since been increased to 150.

In 1899 the Chicago Board of Education appointed 50 medical inspectors at $50 per month to serve during the school year while school was actually in session.

In Boston, though proposed by the Board of Education in 1890, lack of funds delayed the carrying out of the plan until 1894. In Paterson, N. J., it exists since 1900; in Minneapolis, since 1901; in Detroit, since 1902; in Lincoln, Neb., since 1901. In our own district I have had our Board pass a resolution by which I am empowered to call in medical inspection whenever needed. This is a good beginning, but it is not enough. Can we not have a law added to the consolidated school law which would make medical inspection obligatory upon all boards of education?

I ask you, Fellows of the State Medical Association, to take the initiatory step in this most important and noble enterprise. All hygienic measures are the therapeutics of preventive medicine—the great medical goal of the future. And since the future of our great republic rests with the generations to come, and since it lies in our hands to make them better and better prepared for their great tasks, let us be up and doing. The intelligent physician, par excellence, is a true guide in all that concerns the proper development of our children. Then let us all strive to be such guides, preparing all these millions of budding citizens for direct and in-

direct self-preservation—for parenthood, for citizenship and the miscellaneous experiences of life.

DISCUSSION.

DR. E. B. SILVERS, of Rahway, N. J., said that he had been superintendent of the schools of his city for many years, and he could heartily endorse what had been said in the paper. At first a number of young and poorly equipped teachers had been placed in charge, through social, religious and political influences, making their positions mere stepping stones to matrimony. Of good hygienic conditions they were entirely ignorant; ventilation and temperature were measured by the feelings of the teachers when they were excited by the effort of faulty discipline. Thermometers were introduced and properly placed, and these young ladies were directed to consult them. Only mature teachers should be placed in the primary and intermediate departments where the masses are chiefly educated.

DR. JAMES J. WALSH, New York, thought we should all be grateful to Dr. Schmid for showing us what should be and could be done. Certainly there had been a great deal of neglect in this matter. Physicians must be careful, however, that they do not make mistakes and run into fads. There were some things in the paper that perhaps might be taken exception to. Vertical writing has not proved as acceptable in practice as in theory. The present tendency in this country is to go back to slanting writing. The three hundred years we had had slanting writing led many educators to think that there was something in the mental make-up of the human being, not yet well understood, which made him tend to slanting writing. There are many things which can be done, and our school inspectors at the present time are very properly engaged in an earnest effort to prevent the spread of many contagious affections, some dangerous to life, others merely a handicap in life. There were many improvements in medicine of which the public knew very little. For example, it was known that the operation for adenoids had done much, not only by improving the respiration, but in increasing the mental capacity and development. The teaching of hygiene and physiology in this country was nothing but a laughing stock to Europeans. We were teaching a lot of untruths and nonsense about alcohol, and that was about all. Unfortunately, our text-books were absolutely dedicated to us by a set of fanatics, and unless these books contained a certain amount of a certain physiological teaching these

books would not be approved, and yet just such teachings had failed to receive the approval of the scientific world, as any one may see who cares to read the report of the Committee on the Physical Aspects of the Liquor Problem, recently published under the direction of such men as Billings, Welch, Chittenden, Bowditch and Atwater.

DR. SCHMID, in closing, urged that a committee be appointed, or the Committee on Legislation be requested, to take steps which might carry out the intent of his paper. In his own district the Board of Education had passed a resolution empowering him, in the event of the occurrence of contagious disease among the children, to call in a physician and have the whole class examined. In a number of instances he had succeeded in this way of stamping out epidemics of diphtheria and even of scarlet fever.

EDUCATION AND THE ELIMINATION OF CRIME.

The following (Consular Reports, Dec., 1903) is a résumé of an article (translated in the Bureau of Statistics) in "Die Woche" (The Week), a German magazine, of August 22, 1903:

Since the Prussian schoolmaster is said to have won Sadowa, education in Europe has been taken as the measure of culture. Knowledge of the elementary parts of the sciences is now regarded as essential to progress. Everywhere in the Western World the school doors are being flung wide open, particularly for the people who have to labor. Taking the year 1840, the year in which the modern movements may be said to have got fully under way, and compare it with the year 1896, the year for which one can find statistics for most European States, we find that the percentage of those who could write in those years was as follows:

Country.	1840. *Per ct.*	1896. *Per ct.*
Great Britain	59	94
France	47	95
Germany	82	99
Russia	2	22
Austria	21	69
Italy	16	56
Spain	14	42
Holland	70	90

Belgium	45	83
Scandinavia	80	99
Switzerland	80	99
United States	80	83

These figures furnish cause for rejoicing.

While the percentage of increase in the population between 1840 and 1888 was only 30 per cent., the educational increase was 145 per cent. The percentage in the United States is depressed by the hundreds of thousands of ignorant immigrants. As long as the tide of immigration took its supply from lands in which education was advanced and compulsory the United States stood farther up the list. In 1889 92 out of every 100 grown persons could read and write. Since that time the immigration from western Europe has fallen off and that of eastern Europe increased. Russia, Hungary, Austria, and the Danubian lands have been sending their children to the New World, and the percentage for the United States went down; this, too, notwithstanding the fact that the Commissioner of Immigration is supposed to keep out all those who cannot write their own names. Some of the foregoing figures are based upon estimates, hence are to be carefully considered. Figures taken from the different recruiting offices are a better basis upon which to build. In these, Germany leads again, with only 1 in 1,000 unable to read and write:

Country.	*Per* 1,000.
Germany	1
Sweden	1
Denmark	4
Switzerland	22
Holland	40
France	49
Belgium	128
Austria-Hungary	220
Greece	300
Italy	380
Russia	620
Servia	790
Roumania	890

The number of men in Great Britain who could sign the marriage register was 67 per cent. in 1841, and 88 per cent. in 1888;

of the brides, 51 per cent. could write in 1841, and 84 per cent. i 1888. In France, 55 per cent. of the women, and 71 per cent. (the men could write in the marriage register in 1861, and 78 p cent. of the women, and 86 per cent. of the men in 1883. I Italy the conditions, though bad, are encouraging. In 1871 on 23 per cent. of the women were able to write in the marria register; in 1883, 33 per cent. It all indicates the marvelo progress of modern times in the matter of education. France, particular, in a shining example. She now leads, and Germa steps back from first place. The amounts paid by France f education increased more than fivefold from 1860 to 1892. B tween 1880 and 1892 they more than doubled. In other word they went from 28,000,000 marks ($6,664,000) in 1860, to 6(000,000 marks ($15,708,000) in 1880, and 148,000,000 mar ($35,224,000) in 1892, although the population was practically a standstill. The schoolmaster of Sadowa and Sedan has taug France well. Mulhall was of the opinion that there was a dire connection between ignorance and crime. As proof of this, furnished the following figures showing the illiteracy and crin in Great Britain:

Description.	1841-50.	1851-60.	1861-70.	1871-80.	188
Children at school to every 1,000 of population..	11	26	47	82	12
Criminals to each 100,000 of population	122	96	68	50	3

The number of youthful criminals fell from 45.8 per 100,000 (population to 21.5, and this brilliant result was attributed by M Mulhall directly to the improvement in education. Now, we a the last in the world to depreciate the value of education as an a to good morals and civic virtue, but it seems to us to be going t far when we give the school all the credit for this great change f the better. For, alas! in other lands, equally well provided wi schools and educational facilities, the number of youthful crimina is increasing. In Germany 741 per 100,000 of population in 188 and 873 in 1895, were condemned for crimes; but the number (youthful criminals went up from 31,510 to 44,380, or from 8 per 1,000 to 98 per 1,000 of those sentenced. There was an i crease in youthful crimes of 40 per cent., while the population i creased but 10 per cent. This shows that the connection betwe

crimes of young people and education is not so close as Mr. Mulhall would have had us believe.

The humane state will have to devote a large part of its work of crime prevention through educational agencies. In this regard, it is interesting to note that there is a close connection between prostitution, vagabondage—this fruitful mother of crime—and crime. Among the masses of women who sell themselves for the world's pleasure, the illiterate make up by far the largest part; on the other hand, the highly educated supply only a vanishing fraction. In Paris, out of 4,470 examined, 2,392 could neither read nor write, 1,780 could barely read and write, and only 110 could do both well. In Manchester, not 1 per cent. of those examined could read and write. Dr. Baer, the distinguished advocate of temperance, tells us that of Germany's criminals 14.4 per cent. were analphabets—persons ignorant of the alphabet. In some penitentiaries east of the Elbe 54 per cent. were illiterates. There is doubtless a connection between education and the decrease of crime, but one must not forget that the almost miraculous change in England is largely due to the wonderful advantages offered by the fairy-like progress in material things through which England has passed during the last fifty years. While the prices of foods, clothing, and living generally has decreased, wages have gone steadily upward. Want and temptation vanished; hence crime, so long affected by the price of bread, decreased. The better education has only helped as one factor in progress.

One ought to add, by way of suggestion, at least, that the increase in crime on the Continent, particularly in Germany, may be due, in a very large measure, to the great change in the lives of the people. Since 1840 the German Empire has changed from a farming or agricultural state to an industrial or manufacturing one. In 1840 67 per cent. of its people were on farms, and 33 per cent. in mills; to-day, 66 per cent. are in the mills, shops, etc., and only 34 per cent. on farms.

SOME DISCOVERIES FOR THE PREVENTION OF DISEASE.

The first of a series of health lectures, under the auspices of the Royal Institute of Public Health and the Town Council, took

place in the Assembly Room of the Town Hall, Chester, November 19. The lecturer was Prof. W. R. Smith, M.D., D.Sc., F.R.S. (Edinburgh), President of the Royal Institute of Public Health, who took for his subject, "Some Discoveries for the Prevention of Disease."

The lecturer explained that the series of lectures were under the auspices of and also managed by the Royal Institute of Public Health, with the co-operation of the Town Council, and were for the object of bringing home to the citizens a few points connected with the important subject of public health, and this not only to give them a more intelligent concern in those matters, but that they might better appreciate some of the reasons which guided the Council as the Public Health Authority in the action which they took from time to time under the parliamentary powers vested in them. After showing the relation of the duties of the physician and the public health officer—the curing work of the one and the preventive duty of the other—the professor dealt with the history of disease in this country, reviewed the various and numerous pestilences which used to so frequently ravage the country, such as the "black death" of mediæval history, and also cholera, scurvy, prison fever, smallpox, etc. He then dealt with the advance and triumphs of medical science and its effects upon the public health, and also reviewed and eulogized the great bacteriological researches and experiments of Louis Pasteur, and the innovation of the antiseptic treatment in surgery by Lord Lister. Turning to the subject of micro-organisms, he explained the difference between "micrococci" and "bacilli," and showed the part they played in disease; then proceeded to deal with several well-known forms of disease. Turning to tuberculosis, the lecturer quoted numerous statistics to show that death from tuberculosis had steadily fallen during the past half century, *i. e.*, 3,484 per million during the years 1851-60, to 2,059 during the decade 1890-99, or a diminution of 40.9 per cent; a further reduction to 1,899 in 1900, making a total reduction of 45½ per cent. They must recall the fact that phthisis was a form of tubercular disease which overshadowed all other tubercular affections. There was no better criterion of the public health of a district than the death rate from phthisis, though the error was commonly committed of estimating the health of a district from the returns of zymotic diseases. Consumption was always considered to be a hereditary disease, and the greatest pains were taken to trace the disease from some worthy or unworthy ancestor. That was all now a

thing of the past. They could have no tubercle of consumption without the presence of tubercular bacilli, and the disease could only be transmitted through the agency of the bacilli. In that case heredity, as they ordinarily used the term, could account for but very few—in fact, none—of the cases of tuberculosis that occurred in man or animals. Children did not inherit tuberculosis from their parents, although they might inherit a weakness of constitution that would enable them to nourish the parasites which had caused the trouble to their parents. All that was necessary to enable a child to withstand the effects of the bacilli was to strengthen the tissues and build up the constitution with good food, fresh air, sunlight, and plenty of exercise, and further, to place the child in such conditions that the bacilli could not obtain access to him. Every case of consumption must arise from a pre-existing case, and it was interesting to note that during the past fifty years deaths from consumption and other forms of tubercular disease, so far as adults were concerned, had been reduced 50 per cent. This was mainly due to the attention given to sanitary measures. Consumption, they knew now, was a contagious disease communicated from person to person, and according to some authorities from animal to man, and it did not arise in any other way. The two chief sources of infection were the sputum of infected persons, and the milk from cows with tubercular infected udders. He emphasized the great dangers in connection with spitting and the necessity for only sterilized milk to be used. Local sanitary authorities and officials were fully alive in including tuberculosis in the list of diseases which came under their cognizance. They were doing their best to encourage the voluntary notification of the disease, and they further endeavored by the issue of pamphlets giving hints to householders, and by the examination of milk and prohibiting its sale if found to be tainted with tubercular bacilli, to prevent the spread of the disease. He pointed out that the danger from meat was very much less, as nearly all meat was cooked, and in the cooking operations the germs were destroyed. The causes of tuberculosis now generally recognized were—overcrowding, dirty living rooms, want of ventilation in living rooms, offices, workshops, and factories, and the failure to take precautions to prevent the spread of infection. He wanted to impress upon them the desirability of having plenty of fresh air. Let them open their windows and keep them open, and also allow no lodgment of any particle of dust in their dwellings. Speaking of smallpox vaccination, the lecturer reviewed

the labors of Jenner, and said that it was difficult for us to realize what smallpox was in this country before the time of Jenner. When it did not kill it was followed by the most distressing conditions, such as blindness, deafness, deformity, and generally impaired health. In fact, it was the most destructive of all pestilences because of its universal prevalence in every part of the world among all classes and ages, and in all seasons. Vaccination had been an inestimable blessing to mankind. But, notwithstanding the convincing proofs of the protective power of vaccination, and practically the unanimous verdict of the medical profession in its favor, notwithstanding the authoritative judgment of several Royal Commissions on its utility, and legislative sanction in addition, vaccination had hitherto been carried out in a hesitating and incomplete manner in this country. This one sure safeguard against a loathsome disease had been neglected, evaded, and performed in a perfunctory way, so that there was always remaining among them a mass of susceptible material. After quoting numerous statistics showing the advantage of vaccination, the lecturer said that in Chester they appeared to have very healthy conditions, and were fortunate in having such a controlling body of public health administration as the Council. They were certainly more fortunate than many cities he was acquainted with, and he was happy to see that so many members of his own profession took such an active interest in the public health of the community. He especially praised the work of the ex-Mayor (Dr. Roberts). After dealing with the cause and treatment of diphtheria, and showing the micro-organisms connected with malarial fever, the lecturer, in conclusion, threw out the suggestion that the Council should obtain the services of a woman inspector, and pointed out the great advantage this would be, and how it would tend to the welfare of the poorer inhabitants of the city. (Applause.)

A vote of thanks to the lecturer, proposed by the Mayor, and seconded by Dr. Roberts, closed the meeting.

The lecture was beautifully illustrated with many interesting lantern slides, shown by a powerful electric lantern.—"The Sanitary Record," November 26, 1903.

SOME THOUGHTS ON MARKET HYGIENE.

By Dr. Harvey B. Bashore.

Anyone who has seen the great markets on the East Side of New York, or the Italian market at Mulberry Bend, must be struck by the unsanitary condition of the food offered for sale—it looks filthy, and it is filthy; but the condition between these markets and the markets where we procure our own eatables differs only in degree: to be more definite, it is a question whether all our markets and food stores are not a little behind in their sanitary conditions.

We all want pure air, pure water and pure food. This is our twentieth century birthright. Pure air and pure water have been studied a good deal, and much is known about them; but the food question is made up of so many various items, and so many different conditions enter into it, that it is not so simple as might be desired.

The exposure of food, on the one hand, to the dirt and dust of the street—a common condition—is certainly undesirable: take, for example, bread, which is neither washed nor again cooked before again appearing on the table. Bread is almost universally delivered in a more or less open condition and sold so in the markets, and I should just like to see the bacterial growth which could be cultivated on one square inch of its surface, when it finally reaches the consumer.

I know of one firm in Philadelphia, and I suppose there are many, which ship their bread by express in open crates a hundred miles or so, and then redistribute it by trolley to suburban places —very good bread it is, they say—but it must be very filthy.

I know of another baker who did quite differently: he arranged his market stand with white enameled fixtures; had clerks dressed in white duck, and everything else was pervaded with an air of cleanliness. This stand was the admiration of every one who saw it, and though the bread was probably no better than his neighbors', it looked nice and clean, and that baker is now on the road to fortune. So it seems that people in this particular place and for this particular product preferred to pay for cleanliness; it is the same elsewhere.

The oyster and the fish departments need a complete revision:

oyster shells should certainly be cleaned before opening, for though the mud and dirt clinging to a shell may not contain many germs, we do not care to have it served on the table. The hands of the opener should, above everything else, be clean; nobody cares to have the liquor from the opened oyster drip over the dirty hands of the opener, and there is more in this than mere fancy, for filthy hands certainly carry myriads of disease germs. If the man wore rubber gloves and had on a clean white apron I believe the oysters would taste better—they would certainly be cleaner—and I believe a fortune awaits the man who can open oysters and still look clean and be clean. And now a word about the fish. We all admire fish in the water, but somehow the fish in the water does not seem the same you see at market. White porcelain-lined trays with water connection, so that they can be flushed frequently—with the addition of ice in hot weather—would add greatly to solving the fish market question: a place where no one likes to go, and generally don't go unless business calls that way.

In regard to vegetables we can probably tolerate a little carelessness, for vegetables are almost always so thoroughly cooked as to destroy all dangerous dirt; still, some vegetables, such as lettuce and the early spring greens, are not cooked before eating, and it is possible that disease might be transmitted in this way.

The fruit department, berries, cherries, etc., comes in for a fair share of criticism, for fruits are not often thoroughly washed before serving, and certainly gather much dirt when exposed in public places. The little fruit flies, which feed on fruit, have been known to carry typhoid germs on their feet, can go through the finest mesh of a wire screen, so that nothing but complete covering in glass cases is sufficient protection for fruit.

The California fruit which the "push-cart" men sell on the street corners in New York looks nice, but would any thoughtful person eat of it, after such daily dust exposure? Dr. Bell has called attention to the fact that the intestinal diseases frequently attributed to fresh, and presumably wholesome fruit and vegetables, are due to this dust exposure, and I believe he is right.

The marketing of meat, though not performed in the best sanitary way, probably carries with it little danger to health on account of the thorough cooking it undergoes before eating; yet, white-enameled racks, porcelain trays, glass cases and bright tools would at least seem cleaner, and be more inviting to the consumer.

THE PREVENTION OF PNEUMONIA.

The intention of this article is not to deal with drugs which are to be used for the prevention of pneumonia, because, so far as we know, no such drugs exist. It is, however, important that every physician should recognize that croupous pneumonia is an acute infectious disease, and that as such we should take all possible measures to prevent its spread. There is reason to believe that persons who because of moderate vitality are prone to infection by the pneumococcus may very readily become ill if exposed to this organism. Several times within the last few years we have been impressed with the carelessness of physicians in regard to the possibility of infection by this germ. We have repeatedly seen patients, ill with pneumonia and influenza in hotels, cough violently, and unintentionally expel upon the blanket which covered them tiny particles of sputum which were literally reeking with pneumococci or with the specific micro-organism of epidemic influenza. While the proprietors of these hotels doubtless took care that the bed linen was carefully washed after being used by such patients, in the majority of instances they certainly were not instructed that the blankets were sources of dangerous infection, and doubtless other persons, many of whom were in impaired health, who have slept under these blankets have become infected by pneumonia, and have wondered where they have acquired the disease. Again and again we have seen the carpet exposed to similar chances of infection, and it is by no means uncommon to see a patient rest the surgical gauze, into which he has expectorated, upon the blanket which is in front of him.

While most physicians insist that patients with tuberculosis shall expectorate into spit-cups or cloths which either contain antiseptics or which are at once disinfected, they are far too frequently lax as to the orders which are given for similar treatment of the expectorated material in croupous pneumonia. While we have no way of destroying the pneumococcus when surrounded by some of the conditions which seem favorable to its existence, it is certainly the duty of the physician, not only for the sake of his patients, but also for his own benefit, to see to it that the myriads of cocci cast off by a patient with pneumonia are destroyed before it is possible for them to do further damage by infecting other persons.—"Therapeutic Gazette," Feb. 15, 1904.

THE NEW TEXAS SANITARY LAW.

DISINFECTION OF RAILWAY COACHES, PUBLIC BUILDINGS AND SLEEPING CARS.

The State Health Officer of Texas has just formulated ("Texas Medical Journal," January, 1904) the rules and regulations to govern the disinfection of sleeping cars and public buildings, as required by the law passed by the last Legislature. The law became operative in July last, but because of his duties as Surgeon General of Texas before, during and since the encampment of the Texas National Guard (the Texas Militia) and the responsible, onerous and long-enduring work in the management of two yellow fever epidemics, and other duties of his office, Dr. Tabor really has not had time, nor has he the adequate assistance, to give this matter the attention its importance demands. These rules will be at once and rigidly enforced. They will be supplemented and amplified from time to time as the necessity for same become evident. Dr. Tabor will call a meeting in Austin of all county and city health officers some time in February, for a further conference as to details necessary to make this law effective. By "public buildings" is meant public schools, hospitals, jails, court houses, etc., but whether it means hotels or not, is yet to be decided by the Attorney-General.

Disinfection of Public Buildings, Railway Coaches and Sleeping Cars.

An Act requiring the disinfection of public buildings, railway coaches and sleepings cars, and providing a penalty for the violation thereof, and declaring an emergency.

SECTION 1. *Be it enacted by the Legislature of the State of Texas:* That it shall be the duty of the State Health Officer of Texas, and he is hereby authorized and empowered to prepare rules and regulations governing the proper disinfection and sanitation of public buildings and all railway coaches and sleeping cars operated in the State of Texas.

SEC. 2. It shall be his duty and he is hereby authorized and empowered to prescribe a sanitary code, which shall contain and provide rules and regulations of a general nature for the improve

ment and amelioration of the hygiene and sanitary condition of said public buildings, railway coaches and sleeping cars.

SEC. 3. Every person having control of any public building, railway company, sleeping car company, or other corporation, company or individual, or the receiver thereof, engaged in the carrying of passengers in this State, shall, at their own expense, within a prescribed time after receiving notice from the State Health Officer of the promulgation of the rules and regulations in the above sections mentioned, carry the same into effect.

SEC. 4. If any person having control of any public building, or any agent, manager, operator, employee or receiver of any railway company, sleeping car company, or any individual shall fail to comply with the provisions of this act, and the rules and regulations promulgated by the State Health Officer under the provisions thereof, he shall be deemed guilty of a misdemeanor, and upon conviction shall be punished by a fine of not less than fifty, nor more than two hundred dollars.

Approved, April 6, 1903.

CIRCULAR NO. 1.

By virtue of the authority vested in me by the above act of the Twenty-eighth Legislature, the following rules are hereby prescribed, which shall govern the disinfection and sanitation of public buildings, railway coaches and sleeping cars in the State of Texas, and shall be effective on and after February 11, 1904:

1. Each passenger coach or sleeping car used for passengers must be provided with one cuspidor for each seat or every two chairs. Each cuspidor must contain not less than six ounces of a disinfectant solution approved by this department. The cuspidors to be emptied, washed in a similar solution, and replenished each trip or every twenty-four hours.

2. Public buildings must be provided with a sufficient number of cuspidors, or not less than one in each room or hall, treated in a like manner, and emptied, washed and replenished daily.

3. The floors of cars and public buildings must be sprinkled with a similar solution before each sweeping.

4. Sweeping and dusting of cars are prohibited in transit, except that floors of cars may be swept at division terminals or meal stations where passengers will be given an opportunity to leave

the cars during that time. Seats, windows and walls of ca must be wiped off with a cloth or sponge and not dusted in trans

5. All sleeping cars must be disinfected by fumigation in manner approved by this department at the end of each rou trip in the State of Texas where sleeping cars do not leave t State.

6. All sleeping cars passing through or coming into the St of Texas must be disinfected in the same manner each trip some point in the State approved by this department. All c pets, curtains, blankets and bedding, except linen, to be dis fected with cars.

7. Day coaches used for passengers must be fumigated, wh ever the necessity exists, at some point in this State acceptable this department. If a car becomes infected by being occupied a person having a contagious disease it must be disinfected i mediately at end of run.

8. All public buildings must be disinfected by fumigati whenever the necessity exists for it.

9. Containers of water for drinking, in cars and public bui ings, must be emptied and thoroughly cleansed at least once ev forty-eight hours. (Public schools should be provided with separate cup at each desk for each pupil to drink from, or t pupils should be required to provide same.)

10. Ice, which is used in water coolers in cars, must not dumped on the floors, sidewalks and car platforms where peo have trod and expectorated, and then picked up by unclean har and put into the drinking water. It should be washed a handled with ice tongs.

11. Passengers, patrons, employees or others must be p hibited from washing their teeth or expectorating in basins sleeping cars, passenger coaches or public buildings which a used for bathing the face and hands. Large cuspidors must provided for such purposes.

All local health officers and citizens are requested to assist the enforcement of the above rules.

(Signed) GEORGE R. TABOR,
State Health Officer.

Austin, Texas, January 11, 1904.

MEDICAL EXCERPT.

By T. P. Corbally, A.M., M.D.

The Best Remedy for Extreme Debility.—Animal food has always been recognized as a most stimulating and nutritious food. In recovery from severe attacks of sickness, as pneumonia, typhoid, and the like, meat juice affords an extremely nourishing and stimulating article. But it is always understood that the meat from which it is supplied must be of a pure and healthy kind. It is well known that there is much of this meat supply that is not only of a very inferior quality, but much that is positively unfit for all, especially for the sick. For those recovering from sickness it is desirable to have it in a form properly prepared for digestion and assimilation by organs that are especially enfeebled after protracted illness. Valentine's Meat Juice has long been recognized as a preparation, that for quality of the article in its composition, and the care with which it is prepared, is entirely reliable. It is nutritive and stimulant. It has been used with great advantage in the private practice and also in the family of the writer. In addition it has had extensive use in the wards of St. Peter's Hospital, and always with benefit to the patients.

The Seat of Epileptiform Convulsions, Tonic and Clonic.—M. Nino Samoja ("Le Progrès Médical," Nov. 14, 1903) has followed the method of M. Batelli in order to determine the nature of convulsive conditions, as tonic or clonic, which persist after the application of the alterative current, are under the influence of which of the different nerve centers. From these experiments the author draws the following conclusions:

1st.—The cortical motor zone is the exclusive center of clonic convulsions in full-grown dogs and cats. The remainder of the cerebro-spinal axis does, in them, give only tonic convulsions. In the mammiferous species, or mammalia, less elevated in the series of animal life, as rabbits and guinea-pigs, just as in young dogs and cats, and in the green frog, the motor layers is not the center of the convulsions.

2d.—The bulb, or the isthmus of the encephalon, in the guinea-pig and the rabbit is the seat of clonic convulsions. In the guinea-

pig and the green frog the insulated bulb of the encephalon is the seat of the clonic convulsive center.

3d.—The marrow throughout its whole extent in all the mammiferous animals is the seat of a center exclusively tonic; it never causes clonic convulsions. In the green frog the chord provokes, on the contrary, clonic convulsions. It is seen then that the clonic convulsive center goes up progressively in the animal scale from the marrow to the cerebral meninges; bulbo-medullary in the green frog, bulbar, or basilar, in the guinea-pig and the rabbit, it becomes cortical in the full-grown dog and cat. In man, since in the case of decapitation the trunk presents no sign of convulsions, the seat of tonic convulsions is entirely in the basilar system; that of clonic convulsions is cortical.

BARLOW'S DISEASE.—M. Triboulet, at a meeting of the Société de Pédiatrie, after referring to the usual symptoms of Barlow's disease, and the hesitations and frequent errors in the diagnosis to which this disease so frequently gives rise, especially in its deceptive forms, gave ("Progrès Médical, Jan. 2, 1904) the history of a case which was a long time under observation, one in which no true diagnosis was made. It was the case of a child 23 months old, brought up under very satisfactory conditions, which gradually refused to walk, and cried when it was taken in the arms. They could not find, in any part of the body, a distinctively painful spot; there was no swelling, no deformity appreciable. They at first hesitated as between a mild case of infantile paralysis and the first stage of Pott's disease. Then they considered the possibility of coxalgia, but this was abandoned because there was no distinctive cause. Two surgeons were called afterward, who thought they could find the existence of the early stage of white swelling, and prescribed immobilization. The question was in that condition when the diagnosis was immediately and certainly determined in a most unexpected manner. The mother of the little patient having read in a journal an account of a case similar to that of her child, began to examine the child's gums, and one day found two little spots, to which she immediately called the attention of M. Triboulet at his next visit. Thanks to this discovery of the mother, the disease of Dr. Barlow was immediately recognized, and the success of the treatment soon justified the diagnosis.

HEALING SLUGGISH WOUNDS.—M. Bleck has subjected atonic wounds and other conditions that manifested no disposition to

heal to a very diffuse light, and has observed the good results from the treatment.

SUPPURATION IN THE FRONTAL SINUS.—M. Luc read for the Société de Chirurgie a very interesting communication on the method of Kilian, of Fribourg-en-Brisgau, on the treatment of suppuration of the frontal sinus, which seems to receive to-day the approval of the majority of the rhinologists. The treatment is divided into four principal parts. ("Progrès Médical," Dec. 12, 1904.)

1st.—A curved incision at the lower concavity, descending along the side of the nose.

2d.—Two openings in the bones, one made through the anterior wall of the sinus, and the other separated by a bridge of bone, which forms the superciliary arch.

3d.—Curetting the base through the two openings, and the destruction of the anterior ethmoidal cells.

4th.—Copious washing with oxygenized water, and dusting insufflation with iodoform powder; dressing applying the integuments firmly against the wall of the sinus.

M. Luc has employed this method of Kilian eleven times, and has declared himself to be entirely satisfied. The following are the advantages he has obtained from it:

1st.—A much smaller proportion of relapses: twice only he has been obliged to repeat the operation—it was the first time he employed this process, of which he was not sufficiently familiar with the technical part.

2d.—Diminution, or even total suppression, of the danger of intra-cranial infection (especially of lepto-meningitis foudroyante), because of the destruction of the ethmoidal base, which coexists almost always with the frontal sinus.

3d.—Large communication between the frontal base and the nasal fossa, assured drainage of the base.

4th.—Less deformity of the patient on account of the preservation of the superior orbital arch.

The only risk or inconvenience arising from Kilian's method of operating is the destruction of the pulley of the grand oblique. M. Luc has observed it only once—with his ninth patient. The accident may arise in exceptional cases, as in abnormal extension of the sinus.

PSEUDO ASTHMA.—M. Hayem has studied pseudo asthma on the principle of auto-intoxication, originating in the stomach and

in reflex gastric causes. He reports ("Le Progrès Médical Dec. 12, 1903) the case of a patient, who called at his office, wi dyspnœa so great that it was feared for a time that he would unable to resist the movements of the carriage in bringing hi to his home. In the examination, M. Hayem was forcibly in pressed with a peculiar sound caused by the contraction of t diaphragm. The stomach occupied a large part of the abd men. Nothing remarkable in the heart, not a murmur in t vessels; thoracic sonority exaggerated; râles sonorous and sib lant abundant.

M. Hayem thought it was a case of pseudo asthma, determine by the mechanical sound of the dilated stomach on the lung The treatment was established in consequence: a quart of mil and nutritive injections proved the correctness of the diagnosi

The course of treatment proved that it was a case of parenchy matous gastritis, which was checked by appropriate treatment, an the patient was finally cured of his pseudo asthma.

LA BRONCHOSCOPIE.—The following report presented to th Société Médical des Hôpitaux is thus given in "Le Progrès Médi cal, January 2, 1904:

This session will mark a most important date in the annals of medicine, exhibiting a new and really admirable technic, which was there presented, one which, according to the facts given, will most certainly oblige us to revise the terms of one of the most important organs in our economy—the bronchia. Previous to this successful experiment this location was hidden ground for us. Now, thanks to this new method of exploration by bronchoscopy it has become directly accessible to our senses; it allows us to see not the shadow but the object itself, and at the same time permit us to touch it.

M. Lemoyez has reported a case, which we report here, a case which is the first instance of a foreign body extracted in France from the bronchial tubes by bronchoscopy. The following are the facts in the case.

An upholsterer swallowed a tack which he had held in his mouth. This was followed immediately by a severe attack of coughing with cyanosis and suffocation; calm returned after a time, and the patient was brought to the hospital. There in Laennec the house surgeon supposed that the nail had passed into the digestive tube, and treated the patient on that supposition. But the next day, M. Reclus suspected the presence of a foreign body in the air-

passage, and operated on the patient, under chloroform, according to the method followed in such cases: the body well shaken, the chest pressed and turned in all directions. No result. The patient refused bronchotomy, and went to the Saint Antoine to have the radiograph applied by M. Béclère. This took place on the fourth day after the accident. The result of the examination with the radioscope was as follows: The shadow of a foreign body is distinctly seen verging on the unobstructed field in the right pulmonary region. The form of this shade is that of a nail . . . this nail rises and falls with the movements of respiration; but in efforts to cough it is not seen to move in the trachea. This examination shows:

1st.—The presence of a nail in one of the divisions of the large bronchia on the right side.

2d.—Its envelopment and fixedness in the bronchial canal. The nail is situated opposite the sixth intercostal space, and is a centimeter in length.

M. Lemoyez, associated with M. Béclère, decided to apply, as a test and guide for future action in the use of the new method, recently discovered in Germany, which renders it possible to extract the nail through the natural passage, having it directly under the control of natural sight by means of bronchoscopy.

The operation was commenced by accustoming the patient, by short trials of bronchoscopy superior through the bucco-laryngeal passage. After the fourth session it was possible to introduce a tube, of eight millimeters in diameter, into the right bronchia. At the sixth session this tube penetrated to the depth of thirty-seven centimeters; then the space in which the tube was placed could be distinctly seen as far as the bifurcation of the first right bronchia, where the nail was seen. Here the forceps clicked on the head of the nail, but the electro-aimant, specially constructed, was a little too short to reach it. An attack of coughing followed, and the nail slipped farther down. M. Béclère saw it near the line of the eighth rib, where it entered a distant branch of the bronchia.

Then a few days later in order to allow the use of the bronchoscope farther down a temporary tracheotomy was made, and after allowing the patient to rest for a few days, M. Grisez, the assistant of M. Lemoyez, made a preparatory application of bronchoscopy inferior. Rapidly a tube, ten millimeters in diameter and thirty-five centimeters in length, was introduced. The bifurcation of the bronchia was recognized, the tube penetrated into the right

bronchia and passed on still farther; the interior of a ramification of the first order is seen, the tube then passes into a ramification of the second order; there, at one or two centimeters from the orifice of this latter, M. Grisez sees the head of the nail. He introduces the electro-aimant, and with the first attempt draws out the nail adhering to the magnet.

The whole operation lasted five minutes. The results were excellent.

This sensational communication and the demonstration that was made by M. Kilian, the inventor of the bronchoscope, for directly lighting the bronchial tubes, filled the time of the meeting. It is a marvel of simplicity and ingenuity.

EXODIN, A NEW PURGATIVE.—Professor Wilhelm Ebstein described to the Göttingen Medical Society, December 3, 1903 ("Deutsche Medizinische Wochenschrift," Jan. 1, 1904) a new purgative—Exodin:

"Exodin, the diacetylrufigallic-acid-tetramethyl-ether, is a yellow powder, melting at 180° to 190° C. It is odorless and tasteless, insoluble in water, and with difficulty dissolved in alcohol. Since January 13, 1903," he said, "I have experimented with it very extensively in the university and in my private clinic as well as in consulting practice. The remedy never causes unpleasant by-effects, such as dyspeptic symptoms or eructations. It usually acts in from 8 to 12 hours. The unpleasant diarrheal discharges produced by many otherwise effective purgatives are absent with Exodin. In most cases the first passages are mushy, and even solid. In the course of the next few hours there are usually from one to three more passages, the last being not infrequently thin. The fæces preserve their natural color. In extremely rare cases the first evacuations are diarrheal; entirely watery discharges were hardly ever observed. Once in a while the remedy may be ineffectual, but this is wholly exceptional.

"The action of Exodin is midway between laxative and purgative. It can be used as an evacuant in simple constipation in otherwise healthy persons, and also when sluggishness of the bowels is an accidental complication or a part of some other affection. In pregnancy, even during the first two months, Exodin has, when all other laxatives failed, proved very efficacious and harmless, effecting evacuation of abundant stools without any trouble. The use of the drug at intervals showed that it is always equally active whenever readministered.

"Too much must not be demanded of Exodin. We cannot expect the intestines to react at once to the purgative in cases of old chronic coprostasis, which is kept up by hard and dried scybalæ accumulated in the large intestines; or in spastic constipations in which the spasm of the intestinal muscles prevent defecation; or where paralytic conditions cause the retention. When the intestinal canal is weakened, its refusal to perform its functions becomes more and more obstinate as we irritate it, either by large doses of mild purgatives or by the always reprehensible method of employing so-called drastic evacuants.

"Patients suffering from the severest forms of chronic constipation, who had tried all possible remedies, and whose judgment was unimpeachable, preferred Exodin on account of its prompt, painless and efficient action to all other medicaments.

"Exodin is marketed in the form of 7½-grain tablets, which are tasteless and odorless. One tablet is enough for children. Adults take from one to three tablets; two, however, are usually sufficient to produce one or several mushy stools within 8 to 12 hours. The tablets should be allowed to disintegrate in a suitable quantity of water and the mixture drunk under constant stirring with a spoon. Any Exodin remaining in the glass should be rinsed down with additional water. This method insures the introduction of the remedy into the stomach in the finest possible state of subdivision."

Local Anæsthesia.—F. Gregory Connell, Surgeon to St. Vincent's Hospital, Leadville, Col. ("Annals of Surgery," Dec. 1903), after discussing the unsatisfactory effects of other local anæsthetics, particularly commends the use of Beta-Eucaine. In a series of over 80 cases in which he used this remedy, it was most effectual and without any untoward results whatever. Beta-Eucaine has for its most characteristic and advantageous features the following: (a) Non-toxicity, the fatal dose being between 6 and 7½ grains per 2 1-5 lbs. of body weight; there is practically no possibility of such a dose being injected in the course of an ordinary anæsthesia. (b) It may be sterilized by heat without the loss of any of its properties. (c) It will not deteriorate or decompose with keeping, and (d) it will not increase the tendency to hemorrhage to any marked degree; vasomotor paralysis and secondary hemorrhage occur less frequently than with cocaine. These points have been most influential in placing Beta-Eucaine as the local anæsthetic of choice, and its use is being rapidly increased.

THE COUGH-SEQUELA OF LA GRIPPE.—Dr. John McCarty, of Briggs, Tex. (Louisville Medical College), in giving his personal experience with this condition, writes as follows: "Ten years ago I had la grippe severely, and every winter since; my cough has been almost intolerable. During January, 1902, I received a sample of Antikamnia and Heroin Tablets, and began taking them for my cough, which had distressed me all winter, and as they gave me prompt relief I ordered an ounce box, which I have since taken with continued good results. Last fall I again ordered a supply of Antikamnia & Heroin Tablets, and I have taken them regularly all winter and have coughed but very little. I take one tablet every three or four hours, and they not only stop the cough, but make expectoration easy and satisfactory.

COCAINE IS NOT COCA.—Vin Mariani was used by the profession fully twenty years before cocaine was known in medicine. In fact, through this preparation physicians were made familiar with the properties of Coca, and this was the original and only available form of employing the remedy. The popularity of Vin Mariani has led imitators to foist upon the profession artificial substitutes concocted by adding cocaine to wine. Such base frauds masquerading as Coca Wine—a title originated by M. Mariani—have done great evil and tend to unjustly cause condemnation of all Coca preparations as but false products.

Evils resulting from substitution and imitation of Vin Mariani, and the abuse occasioned by these false concoctions, have led to the introduction of State laws restricting the sale of cocaine and of cocaine preparations. Mariani & Co. are heartily in accord with such humane legislation, and as manufacturers of the standard and original Coca Wine, urge official analysis of their preparation as testimony of the confidence reposed in them by the medical profession, who have long recognized the worth of Vin Mariani, and who continue to prescribe it. It is but just to emphasize these truths and explain the difference between a true Coca Wine and base and dangerous impositions fortified by adding free cocaine.

THE POMEROY FRAME TRUSS.—The Pomeroy Frame Truss is automatically correct, as it restrains the abdominal viscera in a manner corresponding exactly to nature's method in the normal man.

It is not natural to have an active spring pressure concentrating its energy on that point of the abdominal wall which the presence

of a hernia indicates as being already weak. Such active pressure is necessarily given by either a spring or an elastic truss.

The frame truss is a strip of rigid metal carefully fitted so as to conform to the entire contour of the body, on a line passing above the pubes, rising to just below the anterior iliac spine and then girdling the hips to the upper margin of the gluteal muscles. It provides a sort of artificial pelvis that will not slip out of place from any movement of the body. A pad interposed between the frame and the body at the point where resistance is needed, restrains the abdominal contents in a manner similar to the structures of the normal man.

The hernia is controlled by resistance, not forced in by pressure; and this control is absolute.

A water pad is used as the movement of the fluid allows it to conform to the surface against which it lies, and its resistance is positive, water being incompressible.

ALCOHOL FIGHT SUCCEEDS.

Oppenheimer Institute Commission Meets with Much Support in England.

[*Special Cable to the Herald.*]

London, Saturday.—I am asked to state that the Commission recently sent to England by the Oppenheimer Institute of New York, which numbers among its advisory directors Secretary Shaw, Dr. Lyman T. Gage, Senators Hanna and Depew and Bishop Potter and Dr. Parkhurst, has been very successful in its propaganda here.

Lady Henry Somerset, whose interest in temperance work is well known, has written a circular letter to the press indorsing the work done by the charity department of the Institute in the treatment of destitute cases of alcoholism and speaking highly of the results obtained by Dr. Isaac Oppenheimer at a London hospital, where for a couple of months past he has been treating test cases.

Dr. J. E. Price, of New York, recently appeared before the London County Council Inebriates Acts Committee, which supervises the Farmfield Reformatory, where £250,000 ($1,250,000) has been expended. He offered to treat free a hundred test cases gathered from prisons. His proposition is now under consideration.

EDITOR'S TABLE.

SANITARIAN, MARCH, 1904.

All Communications, business and otherwise, all exchanges and all publications for review should be addressed to the Editor, Dr. A. N. Bell, 337 Clinton Street, Brooklyn, N. Y.

MORTALITY AND MORBIDITY REPORTS AND REVIEWS.

BELL, JULIA ANN (HAMLIN), wife of Dr. A. N. Bell, died, at her home, 337 Clinton St., Brooklyn, N. Y., March 7, 1904, in the 84th year of her age.

"Her children rise up, and call her blessed;
Her husband, also, and he praiseth her, saying:
Many daughters have done virtuously,
But thou excellest them all."

TO-DAY.

Life is a battle, and the strife
Ends only with our earthly life.
The bugle call is in the air;
The rush, the conflict, everywhere;
And none but cowards fail to share
In all that makes us what we are.
The forward march, the certain trend,
Of all things to some unseen end—
In vain we seek to turn aside
The onward sweep of that great tide
That bears us to our destiny.
There is no hope, there is no rest,
For those who fail to do their best;
Peace only comes to those who see
That they keep step in harmony
With all that is, or yet may be.

E. A. BRACKETT.

Winchester, Mass.

STATE OF NEW YORK.—Monthly Bulletin, Department of Health, for December, 1903. 7,614,281: Total number of deaths, 11.075; annual death rate, 17.1; deaths under 5 years, 2,009; percentage of deaths under 5 years to total deaths, 18.2; deaths at 70 years and over, 2,174; deaths from zymotic diseases per 1,000 deaths from all causes, 90; from cerebrospinal meningitis, 41; typhoid fever, 137; malarial diseases, 9; smallpox, 2; scarlet fever, 103; measles, 50; erysipelas, 44; whooping-cough, 40; croup and diphtheria, 314; diarrheal diseases, 279; acute respiratory diseases, 2,051; consumption, 1,152; puerperal diseases, 84; diseases of the digestive system (not acute diarrhea), 582; diseases of the urinary system, 914; diseases of the circulatory system, 1,250; diseases of the nervous system, 1,182; cancer, 478; accidents and violence, 595; old age, 400; not classified, 1,368.

The Principal Causes of Death for the Year.—There have been reported during the year, including 578 delayed returns received after the issue of the Monthly Bulletin, 127,100 deaths during the year, which makes a mortality per 1,000 population of 16.7. While the total mortality is about 3,000 greater than that of last year, the estimated increase in population reduces the death rate from that of 17.0 per 1,000. The increase occurred for the most part in the cold weather months, but the deaths of July were a little greater than last year, which was unusually low; it is, however, below the average of this midsummer month. The November mortality was, on the other hand, unusually high, for while this month has usually the lowest mortality of any in the year, it was, this year, 1,000 greater than in 1902, and exceeded the reported mortality of September and October. The increase was chiefly in acute respiratory and other local diseases.

The *infant mortality* exceeded that of 1902 by 1,500, but it was exceptionally low last year, and it is still 4,000 less than the average. In some years there have been 10,000 more deaths under 5 years of age than were reported this year. The 22,000 at age of 70 and over constitute the same percentage of the entire mortality as in 1902, 17 per cent. of all deaths.

Zymotic diseases caused one-eighth of the mortality of the year, against 14.0 per cent. last year, and is as low as has ever appeared in past years, the range having been from 12.0 to 22.0 per cent. of all deaths.

Smallpox caused 41 deaths, all but 16 occurring in and about Rochester. Most of the deaths occurred in the first half of the year. After general quiescence during the summer it recurred in

the fall pretty widely, the chief centers being, at the end of the year, in Chautauqua and Cattaraugus counties, where it has been very general for a long time; in Orleans, Niagara and Wayne counties and in the region about northern Saratoga County. Limited outbreaks have occurred in numerous other localities. The Southern tier, east and west central districts have alone been free from fatalities from smallpox.

There were 10,250 deaths from *pneumonia* and 7,960 from Bright's disease. The acute respiratory mortality was about the average. *Grippe is* estimated to have caused 8,000 deaths, and its annual recurrence is apparent during the closing weeks of the year.

New York City, 3,732,903. Total number of deaths, December, 5.914—annual death rate, 18.6: Borough of Manhattan 1,917,676; deaths, 3,145—death rate, 19.4. Borough of the Bronx, 268,341; deaths, 476—21.0. Borough of Brooklyn, 1,219 597; deaths, 1,988—18.1. Borough of Queens, 182,681; death 202—13. Borough of Richmond, 72,608; deaths, 103—16.7.

THE LATE DR. CYRUS EDSON.—At a meeting held January 1 1904. the Medical Board of the Willard Parker and Riverside Hospitals adopted a resolution to the effect that "In the death Dr. Cyrus Edson the profession has lost a broad-minded physician and a progressive and scientific sanitarian, who labored with tireless energy, intelligent effort and marked executive ability the office of Commissioner of Health and the subordinate offices in the Health Department which he held before he attained the commissionership." And also that "The Medical Board holds in affectionate remembrance the uniform courtesy and kindness of which each of the visiting staff of these hospitals was the recipient during Dr. Edson's administration of the Health Department Ever ready to discuss projects for the welfare of the hospitals he gave them full consideration and approval, if possible, and the aid of his executive power in their accomplishment."

DRINK PILES WORK ON COURTS.

Magistrates Report that of 22,152 Additional Arrests Last Year 18,770 Were for Intoxication.

The Board of City Magistrates of the Boroughs of Manhattan and the Bronx has prepared its annual report for 1903. Acting President Baker signs the report, with Philip Bloch as Secretary

In 1902 the total fines collected were $84,065.05, and in 1903, $83.133.50, a decrease of $931.55.

The board recommends the following in reference to corporation ordinances: "We renew the recommendations made last year giving the Magistrates specifically the power to impose a fine for violation of corporation ordinances, and in default to commit the offender in default of payments thereof not exceeding ten days. The summary powers of conviction vested in the Magistrates in minor violations of the Sanitary Code has been found to be a public benefit."

The Board recommends a new building for the Essex Market Court.

The increase over last year in arrests is 22,152, of which increase the offences of disorderly conduct and intoxication furnish 18,770; violation of corporation ordinances, 1,241; disorderly house keeping, 304; gambling and gambling house keeping, 86; and violation of the liquor tax law, 3,168. There is a decrease in burglaries of 185; grand larceny, 159; homicide, 42; insanity, 66; vagrancy, 850; petit larceny, 94, and violation of the lottery law, 77.

The Board, in reference to probation cases, says:

"The probation law continues to work out satisfactory results, and the officers that find it their duty are doing faithful and conscientious work. The beneficence of the law was enjoyed by 2,708 individuals, of whom 2,054 were males and 654 were females. At the end of the year 848 cases were still open and pending."

CALIFORNIA.—San Francisco. Plague is still present, 3 cases having occurred since January 1st, to date, February 12, 1904.

Los Angeles, 135,000. Health report for January: Deaths, 291—41 under 5 years; death rate, 21.72. From specific infectious diseases, 74; tuberculosis, 64—"14 had lived here less than three months, 3 between three and six months, 5 between six and twelve months, 15 between one and five years, 5 between five and ten years, 17 over ten years, unknown 1, life 3."

COLORADO.—Denver, 175,000. Report for November: Deaths, 245; premature and still births, 9. Death rate, per annum, 16.80. Deaths from phthisis, 60—57 contracted elsewhere; typhoid fever, 75 cases, 16 deaths; smallpox, 3 cases; chickenpox, 1 case; diphtheria, 49 cases, 2 deaths; scarlet fever, 57 cases, 1 death; measles,

41 cases; whooping-cough, 1 case. Deaths from heart diseases, 17; pneumonia, 23; bronchitis, 2; nephritis, 8; cancer, 5.

CONNECTICUT.—Bulletin for December: Deaths, 1,322—151 more than in November, and 24 more than in December of last year, and 128 more than the average number of deaths in December for the five years preceding. The death rate was 18.0 for the large towns; for the small towns, 14.0; for the whole State, 17.0. Deaths reported from infectious diseases, including diarrhea, 243 —18.3 per cent. of the total mortality.

Cases of infectious diseases reported: Smallpox, Newington, 2; measles, 1,722 cases in 63 towns; scarlet fever, 164 in 39 towns; diphtheria and croup, 152 in 30 towns; whooping-cough 55 in 8 towns; typhoid fever, 65 in 29 towns; consumption, 2[illegible] in 6 towns.

DISTRICT OF COLUMBIA, 300,902—91,603 colored. Report for the week ended February 6: Deaths, 118—18 under 5 years. Death rates, 18.4 for the whites, 24.9 for the colored, and 20.4 for the entire population. The prevailing causes of death were pneumonia, 17; consumption, 21; diseases of the kidneys, [illegible] apoplexy, 5; diseases of the heart, 15.

Cases of typhoid fever continue to diminish. At the close of the week there were 24 cases; 1 new case was reported. Scarlet fever has increased from 58 cases last week to 65 now under treatment.

ILLINOIS.—Chicago. Statement of mortality for the month of January, 1904, compared with the preceding month, and with the corresponding month of 1903. Death rates computed on estimated figures of midyear populations of 1,950,000 for 1904, and of 1,820,000 for 1903:

	Jan., 1904.	Dec., 1903.	Jan., 1903.
*Total deaths all causes.....	2361	2354	2573
Annual death rate for 1,000..	14.24	14.69	16.07
Under 1 year.....	439	400	457
Between 1 and 5 years.....	180	214	248
Over 60 years.....	533	537	541
Important causes of death:			
Acute intestinal diseases.....	83	81	84

*Deaths resulting from the Iroquois Theater fire not included in this total. Returns not yet received from coroner's office.

Apoplexy	64	62	61
Bright's disease	156	166	139
Bronchitis	123	101	121
Consumption	248	228	252
Cancer	85	82	92
Convulsions	59	67	44
Diphtheria	40	59	39
Heart diseases	205	191	197
Influenza	22	13	9
Measles	1	7	26
Nervous diseases	95	120	120
Pneumonia	504	498	479
Scarlet fever	15	17	40
Smallpox	1	0	4
Suicide	31	42	34
Typhoid fever	30	36	97
Violence (other than suicide)	110	124	131
Whooping-cough	1	5	39

Public Water Said to be Bad.

Investigation by the State Board of Health has disclosed the fact that the public water supply in a number of Illinois cities is dangerous. The board is now nearing its completion of the collection of samples of city water supply in every municipality of the State in excess of 2,500 population. Not all the samples have been analyzed, but this portion of the work will be disposed of in a short time.

In Pontiac the water supply was found to be slightly polluted. Action was taken by the State board, and the local board was directed to order the removal of an intake which was found to be the source of trouble. Mayor S. A. Rathbun has written Secretary Egan, of the State board, that the change has been made as ordered, and expresses the belief that without the action of the State board the water company could not have been prevailed upon to act except by resort to the court. Similar cases have developed at several other points.

Dr. E. F. Baker, Medical Inspector for the State Board of Health, reports to Dr. J. A. Eagan, Secretary of the State Board of Health, from Sandoval, Marion County, that there are twenty-five cases of smallpox in the village, and a number in the county surrounding Sandoval; also, several cases at Odin, in the same county.

Doctor Baker is there, taking steps to check the spread of the disease.

Smallpox in Sangamon County.—Several cases of smallpox were reported by Dr. J. W. Robinson, of Berlin, Sangamon County. The cases are all in one family and under a strict quarantine. One case is reported from Island Grove.

Inspectors from the State Board of Health have returned from a visit to Canton, Fulton County, where an outbreak of typhoid fever was reported. They report that only a few cases exist and there seems to be no danger of a further spread. Over one hundred cases of typhoid fever occurred in Canton in December. As soon as the State Board of Health was advised of the outbreak an investigation was made and the water of the city analyzed; it was found that the disease was caused by water from a factory well. The well was ordered closed, and since then no cases have developed, except in families originally infected.

Dr. J. A. Eagan, Secretary of the State Board of Health, has been appointed Chairman of the Committee on Typhoid Fever of the Conference of State Health Officers, and the United States Public Health Service, by Supervising Surgeon-General Walter Wyman. The other members of the committee are Dr. Samuel A. Abbott, Secretary State Board of Health of Massachusetts; Dr. William C. Woodward, Health Officer, District of Columbia; Dr. J. S. Fulton, Secretary State Board of Health of Maryland, and Dr. J. N. Hurty, Secretary State Board of Health of Indiana.

The Illinois State Board of Health is now preparing rules and regulations concerning the prevention and suppression of typhoid fever. These will be formally adopted by the State Board of Health at the annual meeting next week. Copies of these rules will be sent to all newspapers in the State, and to every county, township, village and city health officer. Copies of the rules will be distributed among the people by the local health officers.

INDIANA.—The monthly report of the Indiana State Board of Health says: Measles was reported from all parts of the State in December. There were 9 deaths and the lowest estimate of cases is 10,000. Tonsillitis was second in prevalence, many of the cases, no doubt, being diphtheria. Pneumonia was third in prevalence, then rheumatism, bronchitis, influenza, smallpox, scarlet fever, typhoid fever, diphtheria and diarrhea in the order named.

Smallpox—523 cases, with 2 deaths, in forty counties was re-

ported. In the corresponding month last year there were reported 642 cases, with 17 deaths, in forty counties. Almost one-half of the cases—212 in number—were reported from Clay County. The first marked epidemic of smallpox occurred in Clay County four years ago, and despite many deaths and a great number of severe cases, it has been impossible to secure general vaccination.

Tuberculosis.—The deaths in this month numbered 371, a rate of 173.9 per 100,000. In the same month, a year ago, the deaths numbered 319—rate, 149.5.

Typhoid fever caused 65 deaths. In the same month, last year, 91 deaths were reported; 58 of the 92 counties reported the disease present—701 cases in all.

Pneumonia caused 392 deaths—rate, 183.8 per 100,000. In the same month, last year, 267 deaths were reported, a rate of 125.1. The city rate was 275.1; the county, 136.5.

By other causes than above the deaths were: Diphtheria, 54; scarlet fever, 34; diarrheal diseases, 23; cerebrospinal meningitis, 34; influenza, 35; puerperal fever, 10; cancer, 91; violence, 153.

IOWA.—State Board of Health Bulletin for January reports outbreaks of infectious diseases for the preceding month: Diphtheria, 9 localities; scarlet fever, 40 localities; measles, 2 localities; whooping-cough, Des Moines; chickenpox, Webster City; smallpox, 11 localities.

LOUISIANA.—New Orleans, 317,000—84,000 colored. Report for January, 1904: Total deaths, 448 white, 285 colored—733; deaths under 5 years—white 90; colored, 48. Death rates: Whites, 23.07; colored, 40.71: 27.74. Deaths from typhoid fever, 7 white, 2 colored; influenza, 22 white, 22 colored; tuberculosis of the lungs, 56 white, 44 colored; pneumonia, 65 white, 54 colored; Bright's disease, 26 white, 12 colored; cancer, white 19, colored 5; senile debility, white 27, colored 13.

MICHIGAN.—There were 3,126 deaths reported to the Secretary of State for the month of January, corresponding to a death rate of 14.7 per 1,000 population. The number was 184 larger than that registered for the preceding month, and is also greater than the number for January, 1903.

By ages there were 490 deaths of infants under 1 year of age, 210 deaths of children aged 1 to 4 years, and 982 deaths of elderly

persons over 65 years of age. The age distribution was practically the same as for the preceding month.

Important causes of death were as follows: Pulmonary tuberculosis, 176; other forms of tuberculosis, 25; typhoid fever, 57; diphtheria and croup, 83; scarlet fever, 34; measles, 12; whooping-cough, 19; pneumonia, 412; influenza, 101; cancer, 134; accidents and violence, 180. There was 1 death from smallpox, which occurred in Kalkaska County.

MINNESOTA.—Minneapolis, 240,000. Report for December: Deaths, 217—28 under 5 years. Annual death rate for twelve months ending December 31, 9.86. Deaths from typhoid fever, 8; consumption, 27; cancer, 16; organic heart disease, 18; other diseases of the circulatory system, 3; pneumonia and bronchopneumonia, 23; Bright's disease, 12.

St. Paul, 180,000. Report for December: Deaths, 127—39 under 5 years; death rate, 8.46. Deaths from consumption, 11; pneumonia, 15; cancer, 8; typhoid fever, 3; scarlet fever, 2.

MISSOURI.—St. Louis, 645,000. Report for December: Deaths, 1,043—207 under 5 years; annual death rate, 19.35. Deaths from zymotic diseases, 117; scarlatina, 15; diphtherian croup, 28; whooping-cough, 2; typhoid fever, 31; remittent fever and congeners, 5; diarrheal diseases under 5 years, 12; cancer, 50; phthisis, 97; bronchitis, 42; pneumonia, 156; other diseases of the respiratory organs, 40; diseases of the circulatory system, 95; Bright's disease and nephritis, 54; accident, 46.

NEW JERSEY.—Hudson County (Jersey City and environs), 421,692. Report for December: Deaths, 694—158 under 5 years; death rate, 19.7. Deaths from croup, 9; diphtheria, 18; scarlet fever, 8; whooping-cough, 2; typhoid fever, 4; all zymotic diseases, 55; phthisis, 79; bronchitis, 18; pneumonia, 123; cancer, 16; violence, 43; still births, 60.

Newark, 272,000. Report for the week ended February 6: Deaths, 134—37 under 5 years; death rate, 25.61. Deaths from contagious and infectious diseases, 30; diphtheria, 3; consumption, 15.

NORTH CAROLINA.—Bulletin of mortality for December summarizes reports of 28 towns, with aggregate population 172,100: white, 100,750; colored, 71,350; deaths, respectively, 116, 136:

252; death rates, 12.8, 22.9: 17.6. Deaths: from consumption, white, 16, colored, 14: 30; heart diseases, white, 14, colored, 7: 21; diarrheal diseases, white, 3, colored, 7: 10; typhoid fever, white, 1, colored, 5: 6; deaths under 5 years, white 18, colored, 48: 66; still born, white, 8, colored, 16: 24.

OHIO.—Cleveland, 420,000. Report for December: Deaths, 554—151 under 5 years; annual death rate, 15.2. Deaths from typhoid fever, 28; diphtheria and croup, 10; tubercle of lungs, 51; pneumonia, 53; broncho-pneumonia, 16; cancer, 13; heart diseases, 32; Bright's disease, 20; diarrhea and enteritis (under 2 years), 13; early infancy congenital icterus, debility, etc., 43; senile debility, 17; still births, 44.

For the year 1903 there were reported: Total deaths, 6,799—2,285 under 5 years of age; death rate, 16.18. Deaths from typhoid fever, 472; diphtheria and croup, 204; consumption, 559; pneumonia, 539; broncho-pneumonia, 130; cancer, 228; organic heart disease, 274; Bright's disease and nephritis, 281; diarrhea and enteritis (under 2 years), 408; congenital debility, 502; senile debility, 256; violence, 518; still births, 467.

PENNSYLVANIA.—Philadelphia, 1,378,624. Report for week ended January 30: Deaths, 562—159 under 5 years; annual death rate, 20.76. Deaths from apoplexy, 18; Bright's disease, 42; consumption, 56; diphtheria, 11; diseases of the heart, 41; typhoid fever, 10; nephritis, 44; pneumonia, 66; cancer, 21; *smallpox*, 17.

Pittsburg, 354,000. Report for the week ended January 30: Deaths, 127—45 under 5 years; annual death rate, 18.65. Deaths from diphtheria and croup, 2; whooping-cough, 3; typhoid fever, 13; tuberculosis, 5; pneumonia, 26; bronchitis, 3; cancer, 3.

Pittsburg's Unenviable Typhoid Record.

A comparative list of typhoid mortality of all cities in the United States of over 30,000 population, for the years 1888-1891, inclusive, shows Pittsburg to be at the head of the list for that period, and Allegheny fourth. In the report of the joint commission in 1894 a table of typhoid fever mortality for the five years, 1888-1892, showed Allegheny at the head of the list and Pittsburg fourth. The two cities showing as great a mortality as that of Pittsburg in this table were Lowell and Lawrence, which have

since applied the remedy. The census of 1880 showed the typhoid fever rate per 10,000 population to be greater in Pittsburg than in any other city in the United States, Nashville being then a close second. These statistics leave no doubt of the fact that Pittsburg has, for a quarter of a century, suffered more from typhoid fever than any other city in the country.—"Pittsburg Despatch."

WASHINGTON.—Seattle, 135,000. Report for January: Deaths, 88—16 under 5 years; annual death rate, 7.80. Deaths from tuberculosis, 12; typhoid fever, 3; diphtheria, 2; organic heart diseases, 7; Bright's disease, 2; cancer, 3; pneumonia, 7.

WISCONSIN.—Milwaukee, 315,000. Report for December: Deaths, 321—100 under 5 years; annual death rate, 11.94. Deaths from typhoid fever, 4; diphtheria and croup, 8; phthisis, 26; pneumonia and broncho-pneumonia, 42; bronchitis, 13; cancer, 19; organic heart disease, 36; diarrheal diseases, under 2 years, 5; Bright's disease, 18; congenital debility, 28; senile debility, 8; violence, 15; suicide, 2; accidents, 13.

Changes in the State Board of Health.

At the annual meeting, January 27, 1904, Dr. C. A. Harper, of Madison, was elected secretary, to succeed Dr. U. O. B. Wingate, of Milwaukee. The office of the secretary will be removed from Milwaukee to Madison, April 1, 1904, and on and after that date all communications intended for the State Board of Health should be addressed to Dr. C. A. Harper, Secretary, Madison, Wis.

The members of the Board at the present time consist of the following:

Wm. F. Whyte, M.D., President, Watertown, Wis.; Q. O. Sutherland, M.D., Janesville, Wis.; F. C. Suiter, M.D., La Crosse, Wis.; Hasso A. Meilike, M.D., Clintonville, Wis.; L. E. Spencer, M.D., Wausau, Wis.; U. O. B. Wingate, M.D., Milwaukee, Wis.; C. A. Harper, M.D., Secretary, Madison, Wis.

PHILIPPINES.—Manila, 19,941. Report for August, 1903: Population of Manila: Americans, 4,389; Filipinos, 189,782; Spaniards, 2,528; other Europeans, 1,117; Chinese, 21,230; all others, 895—total, 219,941.

Deaths from all causes, 862—527 under 5 years. Aggregate annual death rate, 46.17. Americans, 6, death rate, 16.11; Filipinos, 848, death rate, 50.15; Spaniards, 5, death rate, 23.31;

other Europeans, 2, death rate, 21.09; Chinese, 41, death rate, 22.75.

Deaths from typhoid fever, 7; intermittent fever and malarial cachexia, 26; cholera, 63; dysentery, 8; plague, 8; other epidemic infections, 23; tuberculosis of the lungs, 60; eclampsia (non-puerperal), 48; convulsions of children, 221; bronchitis, 32; diarrhea and enteritis, 90; cancer, 1; pneumonia, 5.

PORTO RICO, 953,243.—Report for December: Deaths, 1,868—700 under 5 years; annual death rate, 23.5. Still births, 134; cerebrospinal fever, 10; diphtheria, 2; typhoid fever, 4; pneumonia, 46; puerperal fever, 12; diarrheal diseases, 17; anæmia, 455; bronchitis, 59; heart diseases, 20; tuberculosis, 172; diseases of the nervous system, 27; violence, 12; undefined diseases, 1,016.

BUENOS AYRES, 891,834. Report for November: Total deaths, 1,500—715 under 5 years of age; annual death rate, 20.18. Deaths from typhoid fever, 12; smallpox, 55; measles, 12; scarlet fever, 7; croup and diphtheria, 10; consumption, 158; cancer, 81; meningitis, 116; organic diseases of the heart, 48; pneumonia and broncho-pneumonia, 228; diarrheal diseases, 178; Bright's disease and nephritis, 59; violence, 45.

THE ISTHMUS.

Washington, Feb. 28.—Surgeon J. C. Perry, of the Public Health and Marine Hospital Service, who, since last month, has been at Colon making a special study for President Roosevelt of the sanitary conditions on the Isthmus, has submitted an exhaustive preliminary report to Surgeon-General Wyman. He devotes the greatest portion of his report to the City of Colon, but also describes conditions at Panama and along the proposed route of the Isthmian Canal.

His conclusions are, in the main, most hopeful. He describes the present condition of Colon as woefully unsanitary and unhealthy, and says that its redemption will be an immense task, but that it should be successful. The climate at the camps along the route of the canal he described as far superior to that of Colon and Panama, and he says that with proper sanitary regulations, the health of their occupants should remain good.

TUBERCULOSIS IN ENGLAND.

Dr. Arthur Newsholme, Medical Health Officer of Brighton, gives, in the "Journal of Hygiene," October, 1903, statistical tables from 1850 to 1900. From 1851 to 1865 the death rate was greater among females than males, the difference between the sexes gradually diminishing, however. Since 1865 the death rate has been greater among males, and increasingly so each year.

Since 1881 the death rate from phthisis has declined for males 18.2 per cent., for females 36 per cent.

Other tubercular diseases during the same period have declined for males 20 per cent., for females 17 per cent. The reasons given for this general diminution in the death rate from tuberculosis are improved house construction, improved habits of the people, diminished overcrowding, improvement in quality and quantity of food, and improved industrial conditions. Noting these facts it can easily be understood why the death rate among women has diminished more than among men, viz., the great improvement in the home and its environment.

The fact well known to all close observers that poverty and tuberculosis are close companions is dwelt upon, and the true reason given, viz., that poverty increases the closeness of contact and the frequency of opportunity for infection.

Steps are being taken in some parts of England to secure the notification of all classes of tuberculosis. Voluntary notification has been in force in Brighton four and a half years. Associated with such notification is the following procedure: A history of each case is secured, with the duration and source of infection, place of residence during illness, occupation and work places during the preceding five years, spitting habits, etc. Provision is made for the thorough cleansing and disinfection of all patients' rooms. The patients are instructed in precautionary methods; if poor they are given spit-cups for out-door use, and Japanese paper-handkerchiefs for indoor use. If lodged under favorable conditions, especially if there is danger of infection to others, the patient is sent to the Municipal Sanatorium for one month, even though there may be no hope of recovery. This one month's residence in a sanatorium is of benefit in three ways: the patient is improved and given a new start, the house can be thoroughly cleansed and disinfected, and the patient will have learned in the sanatorium how to care for himself and how to protect others.

The point is well made by the author that the educational aspect of sanatorium treatment is of as great, if not even greater importance than the curative aspect.

The point is made in closing that there should be provision made by law for the care of the advanced as well as the early tubercular cases; that much good can be done through combined public and private enterprise and that there should also be sanatoria for pay patients.

The author draws attention to the fact that in Sheffield there is now an ordinance (passed in 1903) compelling the reporting of all tuberculous cases, and directing sanitary procedures.

THE HEALTH OF LONDON.

Official report for 1903, as summed up by "The Sanitary Record," January 14, in London, with a population of more than four million and a half—There were in all 72,082 deaths during the twelve months, closing the year with the Saturday after Christmas. This number is 15,020 fewer than the average of the last ten years, and is 8,960 fewer than in 1902, which was also a healthy year. It is 16,132 fewer than in 1899, when the population was considerably less. In the last six years there have been 38,590 fewer deaths than the average—a fact probably very intimately associated with the mild winters of recent years. The average death rate for the year of every 1,000 was 15.6, while in 1902 it was 17.8; in 1901, 17.4; in 1900, 19.2, and in 1899, 19.5. There was not a single week during the year with the death rate in excess of the average—a feature which has certainly not occurred in recent years.

The first quarter of the year had the largest number of deaths, there being in London 20,393, which, however, was 4,391 fewer than the average of the last ten years, but the death rate per 1,000, 17.7, was far higher than in any other period of the year. The largest number of deaths occurred in the week ending January 24th, when the total was 1,848, which was only 25 less than the average. There were in the quarter 652 deaths from measles, 761 from whooping-cough, and 4,013 from diseases of the respiratory system. In the second quarter there were 17,054 deaths, which is 3,091 fewer than the average, and the death rate per 1,000 was 14.8. The period was healthy throughout, there being no week with fewer than 132 deaths below the average, while in several weeks the deficiency exceeded 300. There were during the quarter 794 deaths from measles, 479 from whooping-cough,

and 2,747 from diseases of the respiratory system. The deaths from diarrhea and dysentery were 266, being precisely similar to the number from the same cause during the first quarter of the year. For the third quarter the number of deaths amounted to 16,175, which is 4,884 fewer than the average, and the rate per 1,000 was 14.0, which is lower than any other quarter. For each of the weeks ending August 1st and August 8th there were over 600 fewer deaths than usual, the number in the last-mentioned week being 685. During the quarter there were 276 deaths from measles, 230 from whooping-cough, 1,615 from diarrhea and dysentery, and precisely the same number—1,615—from diseases of the respiratory system. The fourth quarter had 18,460 deaths, which is 2,654 fewer than the average, and the death rate per 1,000 was 16.0. The number of deaths fewer than the average exceeded 100 in each week throughout the period, and in the closing week, ending December 26th, was 553. There were in the last quarter 327 deaths from measles, 187 from whooping-cough, 804 from diarrhea and dysentery, and 1,875 from diseases of the respiratory system. For the 76 great towns, with an aggregate population of more than 15,000,000 in the middle of 1903, the death rate for the year was 16.2 for every 1,000 persons living, which is 0.6 higher than the rate for the year in London.

OPPENHEIMER INSTITUTE.

Annual Meeting and Election of Officers and Directors.

The annual meeting of the stockholders of the Oppenheimer Institute was held in Jersey City, January 22d. Ninety per cent. of the stock was represented. Congressman W. H. Jackson, of Salisbury, Md., and Charles Evans, President of the Atlantic City Bank, were elected members of the board of directors, in the places of Daniel Appleton and George S. Davis, resigned. The present directors are: James H. Alexander, formerly vice-president Standard Oil; Jose Aymar, lawyer; Leroy W. Baldwin, President Empire State Trust Company, Manhattan; Archer Brown, of Rogers, Brown & Co.; Charles R. Brown, banker; A. H. DeHaven, New York Stock Exchange; Charles Evans, President Atlantic Bank; Sylvester T. Everett, banker, Cleveland; Anderson Fowler, Carl H. Fowler, George Haldern, E. E. Jackson, ex-Governor of Maryland; Oliver N. Lau, M.D.; John MacGinniss, Vice-President United Copper Company; Kenneth K. McLaren, Secretary Corporation Trust Company, New Jersey; Isaac Oppenheimer, M.D.; Dwight W. Pardee, Assistant Treasurer L. S. and

M. S. R. R. Co.; Leonard W. Sweet, wholesale jeweler; Frank A. Vanderlip, Vice-President National City Bank, New York.

The report of the general manager gave in detail the plan of establishing 100 institutions in the United States during the next two years, and recounted the establishment of the work in England under the guidance of Lady Somerset, and the starting of the work in Canada, Mexico and France.

Announcement was made of the organization of the American Resort Company, formed for the purpose of buying up existing sanitariums and introducing the Oppenheimer treatment. This new company was said to have a strong board of directors, with Dr. J. J. Kindred, President of the Rivercrest Sanitarium, at its head. It is purposed to increase the present stock holdings to from $20,000,000 to $50,000,000. This new corporation is incorporated under the laws of New York State and will be in the nature of a sanitarium trust.

EXAMINATION OF CANDIDATES FOR THE U. S. PUBLIC HEALTH AND MARINE HOSPITAL SERVICE.

TREASURY DEPARTMENT.

Bureau of Public Health and Marine Hospital Service.

WASHINGTON, D. C., February 16, 1904.

A board of officers will be convened to meet at the Bureau of Public Health and Marine Hospital Service, 3 B street, S. E., Washington, D. C., Monday, April 4, 1904, at 10 o'clock a. m., for the purpose of examining candidates for admission to the grade of assistant surgeon in the Public Health and Marine Hospital Service.

Candidates must be between twenty-two and thirty years of age, graduates of a reputable medical college, and must furnish testimonials from responsible persons as to their professional and moral character.

The following is the usual order of the examinations: 1, Physical; 2, Oral; 3, Written; 4, Clinical.

In addition to the physical examination, candidates are required to certify that they believe themselves free from any ailment which would disqualify them for service in any climate.

The examinations are chiefly in writing, and begin with a short autobiography of the candidate. The remainder of the

written exercise consists in examination on the various branches of medicine, surgery, and hygiene.

The oral examination includes subjects of preliminary education, history, literature and natural sciences.

The clinical examination is conducted at a hospital, and when practicable, candidates are required to perform surgical operations on a cadaver.

Successful candidates will be numbered according to their attainments on examination, and will be commissioned in the same order as vacancies occur.

Upon appointment the young officers are, as a rule, first assigned to duty at one of the large marine hospitals, as at Boston, New York, New Orleans, Chicago, or San Francisco.

After five years' service, assistant surgeons are entitled to examination for promotion to the grade of passed assistant surgeon.

Promotion to the grade of surgeon is made according to seniority, and after due examination as vacancies occur in that grade.

Assistant surgeons receive sixteen hundred dollars; passed assistant surgeons, two thousand dollars, and surgeons, twenty-five hundred dollars a year. When quarters are not provided, commutation at the rate of thirty, forty and fifty dollars a month, according to grade, is allowed.

All grades above that of assistant surgeon receive longevity pay, ten per centum in addition to the regular salary for every five years' service up to forty per centum after twenty years' service.

The tenure of office is permanent. Officers traveling under orders are allowed actual expenses.

For further information, or for invitation to appear before the board of examiners, address Surgeon-General, Public Health and Marine Hospital Service, Washington, D. C.

FRENCH CONGRESS ON CLIMATOTHERAPY AND URBAN HYGIENE.

This Congress will be held at Nice, from the 4th to the 9th of April, 1904, during the Easter vacations, under the presidency of Professor Chantemesse, with Professor Renaut, of Lyons; Grasset, of Montpelier; Calmette, of Lille, and M. le Dr. Balestre, of Nice, as vice-presidents.

The questions for discussion will be five:

1st.—The climate of the French shore of the Mediterranean. Reporter, Dr. Chais, of Mentone.

2d.—Climatic adaptation. By Dr. Manquat, of Nice.

3d.—Influence of the Mediterranean climate along the French coast on tuberculosis and tubercular patients.

(a) Clinical and critical study of special conditions. By Dr. Baréty, of Nice.

(b) Open treatment. By Dr. Guiter, of Cannes.

(c) Close treatment: Sanatorium for the wealthy, or those in easy circumstances financially, by Dr. Malibran, of Mentone, and establishments for the assistance of the poor with scrofula and pulmonary tuberculosis, by Dr. Vidal, of Hyères; Co-reporter, Dr. Renon, Assistant Professor and Attendant at the Paris hospitals.

4th.—Influence of the climate of the French shore of the Mediterranean on rheumatism and rheumatics. By Dr. Mories, of Nice; Co-reporters, Dr. Huchard, Member of the Academy of Medicine, and Dr. Triboulet, Physician to the Paris hospitals.

5th.—Disinfection of cities. By Drs. Balestre and Camous, of Nice.

The greatest facilities throughout France and all other countries will be afforded to those attending the Congress; in Nice the hotel charges will be very moderate, and will be determined in advance.

Address, for all information, M. le Dr. Herard de Bessé, Secretaire-Général du Congress, à Beaulieu-sur-mer.

AN INTERNATIONAL CONGRESS OF SCHOOL HYGIENE will be held at Nuremberg, Germany, on April 4-9, 1904. All persons interested in this subject are eligible to membership, after approval by the local committee. The membership fee is $5. Papers and discussions may be in any European language, but the use by preference of English, French, or German is urged. A copy of every paper and formal communication to be presented to the Congress, together with an abstract in one of the three preferred languages (if the paper is in any other language), must be forwarded in advance to the Committee on Organization. The work of the Congress will be divided into general sessions and special sessions. The special sessions will be held on three mornings and every afternoon. Monday, Tuesday and Friday mornings will be reserved for the general sessions, when addresses without debate will be delivered on points of common interest, official addresses will be delivered, and *the business affairs* of the Congress transacted.

written exercise consists in examination on the various branches of medicine, surgery, and hygiene.

The oral examination includes subjects of preliminary education, history, literature and natural sciences.

The clinical examination is conducted at a hospital, and when practicable, candidates are required to perform surgical operations on a cadaver.

Successful candidates will be numbered according to their attainments on examination, and will be commissioned in the same order as vacancies occur.

Upon appointment the young officers are, as a rule, first assigned to duty at one of the large marine hospitals, as at Boston, New York, New Orleans, Chicago, or San Francisco.

After five years' service, assistant surgeons are entitled to examination for promotion to the grade of passed assistant surgeon.

Promotion to the grade of surgeon is made according to seniority, and after due examination as vacancies occur in that grade.

Assistant surgeons receive sixteen hundred dollars; passed assistant surgeons, two thousand dollars, and surgeons, twenty-five hundred dollars a year. When quarters are not provided, commutation at the rate of thirty, forty and fifty dollars a month, according to grade, is allowed.

All grades above that of assistant surgeon receive longevity pay, ten per centum in addition to the regular salary for every five years' service up to forty per centum after twenty years' service.

The tenure of office is permanent. Officers traveling under orders are allowed actual expenses.

For further information, or for invitation to appear before the board of examiners, address Surgeon-General, Public Health and Marine Hospital Service, Washington, D. C.

FRENCH CONGRESS ON CLIMATOTHERAPY AND URBAN HYGIENE.

This Congress will be held at Nice, from the 4th to the 9th of April, 1904, during the Easter vacations, under the presidency of Professor Chantemesse, with Professor Renaut, of Lyons; Grasset, of Montpelier; Calmette, of Lille, and M. le Dr. Balestre, of Nice, as vice-presidents.

The questions for discussion will be five:

1st.—The climate of the French shore of the Mediterranean. Reporter, Dr. Chais, of Mentone.

2d.—Climatic adaptation. By Dr. Manquat, of Nice.

3d.—Influence of the Mediterranean climate along the French coast on tuberculosis and tubercular patients.

(a) Clinical and critical study of special conditions. By Dr. Baréty, of Nice.

(b) Open treatment. By Dr. Guiter, of Cannes.

(c) Close treatment: Sanatorium for the wealthy, or those in easy circumstances financially, by Dr. Malibran, of Mentone, and establishments for the assistance of the poor with scrofula and pulmonary tuberculosis, by Dr. Vidal, of Hyères; Co-reporter, Dr. Renon, Assistant Professor and Attendant at the Paris hospitals.

4th.—Influence of the climate of the French shore of the Mediterranean on rheumatism and rheumatics. By Dr. Mories, of Nice; Co-reporters, Dr. Huchard, Member of the Academy of Medicine, and Dr. Triboulet, Physician to the Paris hospitals.

5th.—Disinfection of cities. By Drs. Balestre and Camous, of Nice.

The greatest facilities throughout France and all other countries will be afforded to those attending the Congress; in Nice the hotel charges will be very moderate, and will be determined in advance.

Address, for all information, M. le Dr. Herard de Bessé, Secretaire-Général du Congress, à Beaulieu-sur-mer.

AN INTERNATIONAL CONGRESS OF SCHOOL HYGIENE will be held at Nuremberg, Germany, on April 4-9, 1904. All persons interested in this subject are eligible to membership, after approval by the local committee. The membership fee is $5. Papers and discussions may be in any European language, but the use by preference of English, French, or German is urged. A copy of every paper and formal communication to be presented to the Congress, together with an abstract in one of the three preferred languages (if the paper is in any other language), must be forwarded in advance to the Committee on Organization. The work of the Congress will be divided into general sessions and special sessions. The special sessions will be held on three mornings and every afternoon. Monday, Tuesday and Friday mornings will be reserved for the general sessions, when addresses without debate will be delivered on points of common interest, official addresses will be delivered, and *the business* affairs of the Congress transacted.

BOOK REVIEWS.

DISINFECTION AND THE PRESERVATION OF FOOD, TOGETH WITH AN ACCOUNT OF THE CHEMICAL SUBSTANCES USED ANTISEPTICS AND PRESERVATIVES.—By SAMUEL RIDEAL, D.S London; Fellow of University College, London; Fellow of Institute of Chemistry, of the Chemical Society, and of the Sa tary Institute of Great Britain; formerly Examiner in Chemis to the Royal College of Physicians, Lecturer on Chemistry in George's Hospital Medical School, and Public Analyst for Lewisham District Board of Works, etc. Author of "Wa and Its Purification," "Sewage and the Bacterial Purification Sewage." 8vo. 504 pages, illustrated. Cloth, $4.00. Or through your bookseller, or copies will be forwarded, postpaid, the publishers on the receipt of the retail price. New Yo JOHN WILEY & SONS, 43 and 45 East Nineteenth St. 190

Preface to the Third Edition.—"This edition has been enti reprinted, and I have altered and revised the book, with such ditions as will bring the subject up to the present time. This involved some excisions and condensations of earlier matter, all the more important historical portions have been retai Since the publication of the last edition I have had the opportu of much experience on special points, and have undertaken searches which have yielded interesting results. The substa of these will be found in the text.

"I trust that the enlargement of the section of food prese tion will make it a manual of practical value to those engage many of our largest trades and industries. Notwithstandin general consensus of opinion against the use of preservative few years ago, it would seem impossible, under modern conditi of life, to do without some methods of keeping perishable arti of food, without incurring a very large loss, and it cannot denied that, with proper safeguards, in some instance even ch ical treatment may be desirable."

The first edition of this work was published eight years a It comprehended, and this edition retains, the gist of a g amount of literature on the subjects of which it treats, knowle of which is of paramount importance to the votaries of preven medicine, and of practical importance to all physicians. Of 504 pages, 407 are devoted to disinfection, beginning with a torical sketch; primitive methods; bacteriology; the method

dealing with bacteria by exclusion, removal and destruction. The subject is then divided and considered in eight comprehensive chapters: (1) Mechanical disinfection—physical means in detail: light, sunlight; substances comparatively inert—coal, dried earth, ashes, etc.; purification of river water; sand filtration, principles of its action, mechanical and sterilizing filters, etc.; cold and desiccation, resisting power of microbes—survival in soil. (2) Sterilization by heat, conditions required for its use, types of disinfectors, etc. (3) Chemical disinfectants: the non-metallic elements and their derivations; the halogens; oxygen and ozone; nitric acid and oxides of nitrogen; sulphur and its compounds; boric acid, borax and other borates; influence of gases on putrefaction. (4) Metallic salts—salts of the alkalies and alkaline earth; zinc, copper, manganese, aluminium salts, chromium, arsenic, arsenites, lead and its salts, mercury and its salts and compounds, tin, bismuth, silver. (5) Organic substances: Coal tar and its products: general account—tar water; hydrocarbons (neutral tar oils)—benzene, toluene, naphthalene, anthracene, naphthalene urinal cakes, "lauraline"; petroleum, phenols, carbolic acid—variation in the commercial strength, carbolic fumigation, antiseptic power of phenol—not a safe disinfectant, uses and dangers, prescriptions in different countries; carbolic powders—McDougall's, Calvert's, Mayor's, phenolith, other patents; surgical preparations—carbolized oil, gauze, carbolic wool, danger of phenol in surgery, carbolic soaps, tooth powders, various preparations; halogen compounds—tribromophenol, iodophenols; sulphonic derivations—"sulphocarbolates," sozo-iodol; cresol and its higher homologues—table of the phenol series, creosote oil, uses of creosote; wood-tar derivatives; guaiacol—medicinal uses; naphthalene and naphthol—its value in internal antisepsis, betol: "microcidine," alumnol, hydro-naphthol, its use in gauze, oxynaphthoic acid; nitro-compounds—nitro-benzene, nitro-phenols, trinitro-phenol or picric acid, its value as an insecticide, nitrocresols, nitro-glycerine, nitro-cellulose, collodion; amido compounds—ammonia, etc.; salicylic acid—three isomerides, salicylates, oil of wintergreen, salol, salophen, phenosalyl, antiseptic value of salicylic acid, patents, "lactacidine," the use of salicylic acid for preserving food, objections, tablets, gauze, etc.; thymol, camphors and essential oils—the terpenes, their properties, and products of oxidation, turpentines, camphors, the oxidizing power of essential oils, ozone test, sanitas, sanitas oil, value of sanitas as a disinfectant, pinol, peroxols.

(6) Compounds related to the alcohols: Methyl alcohol, etc.; formic aldehyde and "formalin"—properties and disinfectant value, action on bacteria, generators, other aldehydes; ethyl or ordinary alcohol—not a reliable antiseptic; formic acid and sodium formate; acetic acid—aromatic vinegar, action of vinegar on bacteria, pyroligneous acid; glycerine—its uses and limitations; hydrocarbons—acetylene; vegetable acids—tartaric, citric, malic, oxalic, succinic.

(7) Practical methods: towns—limited areas, administration; sewers and drains—ash-pits and dust-holes; houses—walls and wall papers, furniture and woodwork, sinks; sick rooms—isolation, clothing, excreta, removal, light and air, spray, after-disinfection, phenol, sulphurous acid, chlorine, liquid disinfectant by spraying, hot solutions, cisterns, water-closets, earth-closets, middens, cesspools, infection by flies, automatic distributors, wood paving, urinals, "urinal cakes," stables, pigstyes and cowsheds, cattle markets and fairs, slaughter-houses, dairies, bakehouses, pigeon and fowl houses, rabbit hutches, cats and dogs, vehicles, skins, furs, wool and hair, rags; disinfection of air—impurities, sewer-gas, vaporizers and filters for air; water and its purification; preservation of timber—copper sulphate, creosote oils.

(8) Personal and internal disinfection: Disinfection of cavities of the body—(a) by washing out, (b) by spray, (c) gargles, (d) injections of gases or vapors, (e) inhalations; antiseptic dressings—antiseptic paper, rinsing surgical instruments; hypodermic injections; antiseptic soaps; mouth washes, ointments; "sanitary wool" clothing; internal antisepsis—phenol, creosote, essential oils, mineral waters, acids, sulphuric lemonade, the Vienna mixture, betol, etc., quinine, benzosol, phenosalyl; vaccination.

The portion on the preservation of food comprehends a lucid description of the causes of change in food—(1) oxidation, (2) reduction, (3) metallic contamination, (4) organisms, methods of exclusion of organisms and the poisonous products of decomposition; methods of preservation in detail—drying, smoking, salting, gases, injection, acids, bisulphites, glycerine, experiments with boric acid and formaldehyde; cold—refrigerating plant; heat—effects of cooking on bacteria, canning processes; milk—a common vehicle for contagion, precaution, sterilization, pasteurization, condensed milk, butter, pasteurized cream, cheese; bread and grain; brewing and vinegar making; legal statutes and regulations.

Methods of analysis: (A) Bacteriological methods—conditions

to avoid error; determination of the antiseptic value—I. Of antiseptics in solution, Wynter Blyth's method for sewage antiseptics, precautions necessary in these tests; II. Of the vapors of volatile liquids, Chamberland and Klein's method; III. Of gaseous antiseptics; determination of the germicidal value—relative value of the culture and inoculation tests. (B) Chemical methods—necessity of analysis, requirements; chloride of lime—preparation of standard solutions and titration.

Altogether, a work replete with practical knowledge for health authorities and medical practitioners.

A MANUAL OF PRACTICAL HYGIENE FOR STUDENTS, PHYSICIANS AND MEDICAL OFFICERS. By CHARLES HARRINGTON, M.D., Assistant Professor of Hygiene in the Medical School of Harvard University. Second edition. Revised and enlarged. Illustrated with twelve plates in colors and monochrome and one hundred and thirteen engravings. 8vo. Pp. 760. LEA BROTHERS & Co., Philadelphia and New York.

The excellence of this work is attested in a measure by the need of a second edition in less than two years after the first. Nevertheless, the progress of knowledge on some of the subjects treated of, during the interval has been such as to require considerable rewriting, the addition of about seventy pages of new matter, and eight new illustrations. We had occasion to say of the first edition (Vol. xlvi, p. 268): "It is a comprehensive work, well calculated to meet the needs of students, laboratory workers, medical practitioners and health officers. It utilizes the results of all the advantages in the many special departments embraced in preventive medicine, and thereby presents a practical survey of the whole field. Thus it deals with food, air, soil, water, habitations and schools, disposal of sewage and garbage, disinfection, quarantine, military, naval, marine, tropical and personal hygiene." The new matter added is, for the most part, on the relation of insects to human diseases—flies, fleas, bedbugs, mosquitoes and filarial diseases—up to date; altogether eminently suitable as a text-book for students and as a practical manual for physicians and sanitary officers.

THE BLUES (SPLANCHNIC NEURASTHENIA), CAUSES AND CURE.—By ALBERT ABRAMS, A.M., M.D. (Heidelberg), F.R.M.S.; Consulting Physician, Denver National Hospital for Consumptives, the Mount Zion and the French Hospitals, San Francisco;

President of the Emanuel Sisterhood Polyclinic; formerly Professor of Pathology and Director of the Medical Clinic, Cooper Medical College, San Francisco. 12mo. Pp. 243. Illustrated Price, $1.50. E. B. TREAT & Co., 241-243 West Twenty-third St., New York.

The title of this book expresses the most prominent symptom of the collective variety of diseases of which it treats, the results of nerve exhaustion, commonly designated by physicians as *neurasthenia.* Its recognition, and the factors involved in its causation, imply our ability to cope with the evil and to offer to the sufferers not only amelioration, but a cure. Prefatorily, the author tells us, that from many years' experience with neurasthenics he knows of no variety of neurasthenia which is more amenable to treatment than the *splanchnic* form—that which is due to a loss of tonicity in the muscles of the abdomen—brought about by malhygienic clothing, occupation, disease, lack of exercise, and a host of other conditions. The decadence of the abdominal muscles is a modern heritage; and so are hemorrhoids, constipation, hernia and a multitude of other evils that may be traced to enfeebled abdominal muscles, amenable to proper treatment. The book is well illustrated by plates and figures well calculated to fix the attention of the reader on the faulty conditions and the natural resources for their correction.

DISEASES OF THE EYE.—By WEBSTER FOX, A.M., M.D., Professor of Ophthalmology in the Medico-Chirurgical College of Philadelphia; Ophthalmic Surgeon in the Medico-Chirurgical Hospital. 8vo. Pp. 604, with five colored plates and 296 illustrations in the text. Price, $4.00. New York and London: D APPLETON & Co.

The author of this book has been long recognized as an authority on diseases of the eye. The work, indeed, is based upon extended experience, and is a well-digested summary of the known facts in ophthalmology, necessary to the student, and of constant utility to the practitioner who is often called upon for advice in ophthalmic cases.

Among the articles of special importance to physicians and surgeons generally, as well as to specialists, particular attention is invited to those upon albuminuric retinitis, hemorrhagic retinitis lid operations, declinations of the retinal meridians, cataract, glaucoma and diseases of the orbit.

The subconjunctival injection of salt solutions in iritis and

corneal ulcers, peridectomy in pannus, grattage in trachoma, and the use of opaque slips, combined with correcting lenses, for conical cornea are also given the prominence to which they are entitled in the subject of treatment. The plates and illustrations throughout are of superior excellence.

A MANUAL OF HYGIENE AND SANITATION.—By SENECA EGBERT, A.M., M.D., Professor of Hygiene and Dean of the Medico-Chirurgical College of Philadelphia, etc. Third edition, enlarged and thoroughly revised. 12mo. Pp. 473. Illustrated. LEA BROS. & Co., New York and Philadelphia.

A concise but comprehensive manual, alike suitable for the medical student, sanitary inspector and for the lay reader. It deals with personal hygiene as well as public health. Besides the introductory chapter of seventeen pages, giving a historical sketch of the life-saving results of practical sanitation, it consists of fourteen chapters: Bacteriology; The Atmospheric Air; Ventilation and Heating; Water; Food; Stimulants and Beverages; Personal Hygiene; School Hygiene; Disinfection; Quarantine; Disposal of Sewage; Military Hygiene; Vital Statistics; Examination of Air and Water, every one of which comprehends matter of importance to persons who would understand the relations of such subjects to the maintenance of health, and above all, to those whose duty it is to maintain the healthful conditions of all such relations. The chapter on school hygiene particularly deserves the attention of all school teachers, school authorities and medical inspectors of schools. Moreover, of parents, with regard to the indications of overwork and the regulations of diet and sleep.

THE SELF CURE OF CONSUMPTION WITHOUT MEDICINE, WITH A CHAPTER ON THE PREVENTION OF CONSUMPTION AND OTHER DISEASES. By CHAS. H. S. DAVIS, M.D., Ph.D., Physician to the Curtis Home for Old Ladies and Children, etc. Price, 75 cents. E. B. TREAT & Co., 241-243 West Twenty-third St., New York.

This is a little book of one hundred and seventy pages, well adapted to the lay reader, containing the gist of much that has been written on the causes and conditions promotive of consumption; the importance of pure air, out-door exercise and wholesome food for its prevention. "Appendix I," however, is, for the most part, fallacious: inconsistent with the truths of the body of the book, which, but for this appendix, would be commendable.

PLAIN HINTS FOR BUSY MOTHERS.—By MARIANNA WHEELER Superintendent of the Babies' Hospital, New York; Graduate o the Training Schools of the New York Hospital and Sloan Ma ternity Hospital, and Author of "The Baby." Illustrated. New York: E. B. TREAT & Co.

A little book of fifty pages, comprising a concise statement o practical knowledge, which no mother, who has the welfare o her baby at heart, can afford to do without.

A HANDBOOK FOR THE PREVENTION OF TUBERCULOSIS.—Being the first anual report of the Committee on the Prevention o Tuberculosis of the Charity Organization Society of New York 12mo. Pp. 400. Illustrated. Published by the Charity Organi zation Society, New York City. Paul Kennedy, secretary, 10 East Twenty-second St., New York.

If it be true that the thorough exposure of an evil amidst a intelligent community is the first and surest means of overcoming it—and we think it is—the prospect, ultimately, of overcoming the most deadly foe to human life in the City of New York i very encouraging. The Committee of the Charity Organizatio Society on the Prevention of Tuberculosis, who make this report consists of sixteen representative physicians, and sixteen other who are especially interested in the social aspect of the disease Among the declared purposes of its work at the outset were:

"Co-operation will be sought not only with charitable agencie of all kinds, but with city departments and State officials. At tention will be devoted to educational propaganda, and the sup port of the public press will be especially sought. The service of a competent secretary, a district nurse, and a statistician wh will devote their entire time to the Committee, have been se cured, and at the same time, in so far as it will be of advantage the entire volunteer body of workers and the expert agents an visitors of the Society will contribute to the objects which it i desired to accomplish.

"The first task will be an exhaustive investigation of some o the social aspects of tuberculosis." The presentation of the re sults of this task is the chief subject of the volume before us "Based on a Study of Statistics," by Lilian Brandt, Secretar of the Committee.

The importance of consumption as a cause of death is shown b an abstract of the report of deaths caused by it in the registratio area of the United States in 1900, giving the death rates pe

1,000 living, sex and age, and its ratio to the total mortality throughout the area. Next follow tabulated statistics of the mortality from tuberculosis in New York City in detail, with diagrams showing age, sex, nationalities, married and single, and locality, with reference to density of population, habitation, insanitary conditions and occupations. A shorter special report follows, pretty much on the same lines, on "Some of the Social Aspects of the Tuberculosis Infirmary, Blackwell's Island," by Homer Folks, Commissioner of Public Charities of the City of New York.

Essays on "The Germs of Consumption," by J. H. Hudleston, M.D.; "Tuberculosis—Its Causes and Prevention," by Hermann M. Biggs, M.D.; "The Duties of the Individual and the Government in the Combat of Tuberculosis," by S. A. Knopf, M.D.; "Tuberculosis and Children," by A. Jacobi, M.D.; "The Climate and Sanatorium Treatment of Consumption," by Henry P. Loomis, M.D.; "Tuberculosis and Its Prevention," by T. Mitchell Prudden, M.D.; "Municipal Sanatorium for Incipient Cases of Tuberculosis"; A Report from the Hon. Homer Folks, Commissioner of the Department of Public Charities; "The Plague In Its Stronghold—Tuberculosis in the New York Tenement," by Ernest Pool; "Institutions Where Tuberculous Patients May Receive Treatment in New York and Vicinity," by Charles H. Johnson, and several shorter summaries and circulars of practical utility. Altogether, a hand-book replete with practical knowledge worthy of the widest possible distribution.

New York State Hospital for Crippled and Deformed Children.—Report for the year ending September 30, 1903.

The hospital building is located at Tarrytown, N. Y., about one mile south of the New York Central and Hudson River Railroad station, at Paulding avenue, on the banks of the Hudson River.

Newton M. Shaffer, M.D., Surgeon-in-Chief and Superintendent, reports that, while this is, strictly speaking, a report of only one year's work, it seems an appropriate occasion to review what has been accomplished during the thirty-four months that the hospital has been in existence.

With accommodations for only 25 patients, 52 have been treated during this period. Of this total, 33, or 63.46 per cent., were cases of tuberculous disease of the joints. Of the whole number treated 27 have been discharged. Of these, 55.55 per cent. were cured and 44.45 per cent. discharged as more or less im-

proved, many of them practically cured; 51.92 per cent. of th whole number treated have been discharged. There have been n relapses or deaths. Those discharged, as cured, are examinec if accessible, from time to time, and those who have been "re lieved" and are still under professional observation, are carefull watched when it it is possible to reach them. Their home sur roundings are known and their parents, so far as possible, will ingly carry out the instructions of the surgeons. If a relaps occurs and the symptoms demand it, these patients are eligible t readmission.

The average time of treatment of the 27 patients discharge since the hospital opened its doors on December 7, 1900, has bee one year, 3.6 months, and of the patients who are now in th hospital, the average residence is one year four months. Of th 25 patients now resident in the hospital, 7 were received durin the 10 months ending September 30, 1901, and 9 during the yea ending September 30, 1902, and 9 during the year ending Sep tember 30, 1903. There should be some way arranged by whic patients, living out of New York City and remote from the hos pital, could be sent to the hospital for a short period every si months to have their apparatus put in order.

It is impossible to state with absolute accuracy the number c applications for admission that have been received during the pas year. Two hundred and twelve formal applications, of which record has been kept, have been received, and verbal application made to the members of the medical staff have been, it is estimatec upward of one hundred and fifty. A formal record of these ver bal applications has not been kept. It is noticed that application from the interior of the State have shown a considerable increas

"With at least three hundred and fifty applications for admis sion, we have been able to receive only twelve patients into th hospital. The number of poor cripples, for whom much can b done, in both city and State, and for whom no adequate hospita accommodations exist, is as yet unknown, but it is safe to say tha there are several thousand of them. The pressing need of th new hospital, various sites for which are now under considera tion, which will soon be erected, and which, when completed, wi accommodate a much larger number of patients, becomes very ap parent when the demands made upon us are even briefly consic ered; and it is with much pleasure that we note that in Ohio, a well as in Minnesota, the care and treatment of crippled and de formed children by the State is receiving proper attention.

"Hampered as we have been by a small and inadequately equipped hospital building; overwhelmed with hundreds of applications, which we have been obliged to decline; lacking the room for a full corps of assistants, and with overcrowded wards, we have, nevertheless, kept in mind the ultimate benefit of those committed to our care; and the excellent results obtained speak well for the resident officials who have given much time and energy to the care of the patients—oftentimes at considerable personal inconvenience."

The work of the hospital for the past year has been carefully summarized in tabular form. Each patient treated is mentioned by number, and the condition briefly stated, both at the time of reception and at the end of the year.

Rules and Regulations.

The hospital was established "for the care and treatment of any indigent children who may have resided in the State of New York for a period not less than one year, who are crippled or deformed, or are suffering from a disease from which they are likely to become crippled or deformed."

The following conditions are imposed upon all applicants: "No patient shall be received except upon satisfactory proof made to the Surgeon-in-Chief, by the next of kin, guardian, or a State, town or county officer, under the rules to be established by the Board of Managers, showing that the patient is unable to pay for private treatment. Such proof shall be by affidavit. (Affidavit blanks will be forwarded upon application to the Surgeon-in-Chief, New York State Hospital for the Care of Crippled and Deformed Children, Tarrytown, N. Y.) If there was an attending physician before the patient entered the hospital, it shall be accompanied by the certificate of such physician giving the previous history and condition of the patient.

Patients from four to sixteen years of age will be received for treatment, and all applications will be acted upon in the order of their reception. No patient will be admitted without an examination by and a certificate from the Surgeon-in-Chief, or in his absence, one of his assistants.

Application for admission should be made to Dr. Newton M. Shaffer, Surgeon-in-Chief, No. 28 East Thirty-eighth St., New York, who will appoint a time and place for the examination of the patient. Patients living at remote points in the State are referred to the following gentlemen (out-of-town members of the consulting staff): Dr. A. Vander Veer and Dr. S. B. Ward, of

Albany, N. Y.; Dr. Louis A. Weigel, Rochester, N. Y.; Dr. Roswell Park and Dr. Charles G. Stockton, Buffalo, N. Y.; Dr. Richard B. Coutant, Tarrytown, N. Y.; Dr. J. Van Duyn and Dr. Henry L. Elsner, Syracuse, N. Y.; Dr. Henry A. Gates, Delhi, N. Y.; Dr. Grant C. Medill, Ogdensburg, N. Y.; Dr. Frank W. Sears, Binghamton, N. Y.

CONTEMPORARY LITERATURE.

The February "Atlantic" offers a group of leading articles which can be neglected by no person earnestly concerned about the urgent issues in America to-day. These papers, in which subjects of the first importance are treated by the men best qualified to discuss them with authority and vigor, are:

"Wall Street and the Country," by Charles A. Conant, a treatise on the uses and abuses of the money power, with which the number opens, followed by a sensible and dispassionate paper on "Lynching: a Southern View," by Clarence H. Poe, and a thoughtful discussion of the question, "Is Commercialism in Disgrace?" by John Graham Brooks.

Henry Villard's "Recollections of Lincoln," from his forthcoming autobiography, throw much fresh and vivid light upon the character of Lincoln as a statesman and as a man.

Among the literary and biographical papers are Colonel Higginson's delightful paper on "English and American Cousins"; Andrew D. White's second and concluding paper upon "Paolo Sarpi," the Italian reformer; a searching and suggestive critical essay upon "Borrow," the author of Lavengro, by H. W. Boynton; Professor Irving Manatt's breezy study of the recently discovered Persians by the Greek dramatist, Timotheos, with an animated English version of the play; "A Basket of Chips," a finely wrought and attractive study of bird songs in winter, by Henry Oldys; a clever roundabout paper on "Cynicism," by Arthur Stanwood Pier, and a characteristic humorous sketch by Martha Baker Dunn, entitled "Cicero in Maine.

The continuation of Robert Herrick's strong serial; short stories by Charles Miner Thompson and Beatrice Hanscom; Robert Grant's delightful poetical tribute to Colonel Higginson upon his eightieth aniversary, and poems by Arthur Ketchum, M. A. DeWolfe Howe, Clinton Scollard, and Rev. J. W. Chadwick, D.D.;

sincere and authoritative book reviews by various hands, and a genial Contributors' Club unite to make an admirable number.

THE CONSERVATION OF ENERGY IN THOSE OF ADVANCED YEARS. —Dr. J. Madison Taylor, of Philadelphia, contributes to the February number of "The Popular Science Monthly" the beginning of an article on this subject, of particularly inviting interest.

"Mere existence beyond the ordinary bounds set by nature is of little value unless accompanied by many characteristics and qualities, which make life worth living.

"The principles of action upon which the effects of advancing years may be postponed are simple, clear and practicable. The difficulties are chiefly the indifference or indolence which age begets. Whenever a person has acquired an active desire to retain the freshness of youth and is moderately diligent in pursuing whatever means should be adopted, the results are successful often beyond expectation. The conditions of success are an original soundness of constitution and fairly healthy organs. . . .

"The potentiality of cellular cleanliness and lymph activity on the mechanism of life is paramount, and is not yet duly appreciated by men in or out of the profession of medicine.

"An enormous field of possibilities is opened by studiously striving to retain the fullest elasticity of all the tissues; and to this I desire to call particular attention with some detail and emphasis in the latter section of this article."

A NEW PHYSICAL CULTURE FOR CHILDREN.

It has long been the aim of educators to find a satisfactory substitute for the stiff and dull gymnastic drill taught in schools. While the regular set exercises have a certain value—since exercise of any kind is beneficial—it is now realized that, on account of their dull, monotonous character they are as fatiguing, mentally, as an equal time spent on mathematics. As the result, a new system of physical culture has been evolved, which makes use of the imagination and dramatic powers to give pleasure to the exercises. The new plan consists in imitating the characteristic actions of animals and other objects of Nature, as well as various phases of the industries, such as the activities of the farmer, etc. By this means children receive healthful bodily exercise, with a pleasant stimulation of the mind. In the March "Delineator," M. Wilma Sullivan describes the new system of physical culture in detail, with pictures that illustrate aptly the different exercises. Exquisite spring styles and illustrated articles on topics of fash-

ion are supplemented by literary features of uncommon interest and value. Lillie Hamilton French has an inspiring paper in the "Joy of Living" series, and in the "Fountain of Youth" Dr. Murray describes the care and treatment of the eyes. The needle and fancy work topics cover a wide range, and most of the other interests of the home are given consideration in the regular departments.

PROCTOR'S THEATERS.

One of the secrets of Mr. F. F. Proctor's success at his various New York theaters is the ample provision made for the comfort of his patrons, not alone while they are in their seats, but in all parts of his theaters. Commodious retiring-rooms are provided on every floor of his houses, public telephones, writing-desks generously supplied with attractive stationery, and messenger service are also at the disposal of his patrons, and there are hundreds of out-of-town persons who regularly make one of the Proctor theaters their rendezvous at the end of a day's shopping, where they are able to give proper attention to their external appearance, and at the same time put themselves in a fitting frame of mind by the enjoyment of the attractive specialties, which are always to be found upon the programmes. The Twenty-third Street and Fifth Avenue, in particular, are regarded by both urban and suburban patrons as virtual club houses, since, with the exception of the restaurant features, every item of women's clubs is to be found there. An official of the fire department recently expressed himself as being most highly pleased with the excellent condition in which he found the Proctor houses. "There are no theaters in the city," he said, "where a proportionately greater vacant floor space is found than in the Proctor houses." The safety of a theater depends not so much on the number of its exits, but on their availability and arrangement. In the Proctor theaters it would be almost impossible to have a panic of serious proportions, since the space around the exits is cleared, and there are no narrow passages in which an excited crowd might become massed. The possibility of a blaze is reduced to a minimum by the adoption of every safety device, and this extra floor space further safeguards the audience by rendering impossible even a causeless panic. Mr. Proctor's entire success, in fact, is founded upon his careful study of the public needs, and an intelligent catering to that demand. Nothing is left undone that might conduce to the safety and enjoyment of his patrons.

THE SANITARIAN.

APRIL, 1904.

NUMBER 413.

INFECTIOUS AND CONTAGIOUS DISEASES.

By A. N. BELL, A.M., M.D.

Infectious and contagious diseases are those diseases which are liable to spread in the community, or over a large area of the earth's surface, when they are designated as epidemic diseases; or to remain among the inhabitants of particular localities, under the influence of local conditions, when they are distinguished as endemic diseases. The words infectious and contagious, as here used with reference to preventive measures for diseases so characterized, are synonymous. All infective diseases are microbic, that is to say, germ diseases, though the specific germs of a number of them are as yet undiscovered. It is noteworthy that the germs of infectious disease generally exist and are cultivated outside the living body, and are commonly fostered by filthy conditions. Quite recently, however, it has been discovered that there are non-pathogenic microbes of wide distribution which, in all respects, except virulence, closely resemble the specific germs of typhoid fever and diphtheria; and non-pathogenic bacilli, similar to anthrax bacilli, have been found to be protective against anthrax. Some authorities regard these harmless (?) bacilli as being identical with the virulent microbes that they resemble, and therefore capable of assuming a virulent character if cultivated under suitable conditions—a view that reintroduces the untenable hypothesis of spontaneous generation in a new form.

Many of the specific diseases, and especially those related to telluric conditions, attach themselves more or less permanently to certain localities, and become abidingly endemic. Thus, cholera in the delta of the Ganges, leprosy in parts of Norway, smallpox in the Soudan and elsewhere, where vaccination is not practiced. And in a less degree, diphtheria and typhoid fever are endemic in several American cities.

From time to time most of the specific diseases break out, to speak, and become epidemic, as smallpox has been in son sections of the United States, where vaccination has been ne lected during the last three years. Occasionally a disease diffus itself so generally over a great part of the globe as to become pa demic, as influenza did a few years ago. The causes of su prevalence are very imperfectly known, hence they have be vaguely attributed to an "epidemic constitution" of the air, or pandemic waves of unknown nature; but more intelligently, meteorological conditions.

The liability to infectious diseases varies in man according age and sex, as well as to locality, climate, season and surroun ings. Children are more liable to measles, scarlet fever, mump diphtheria and whooping-cough than adults. Smallpox, dip theria and croupous pneumonia are most prevalent during the wi ter season; typhoid fever is most prevalent during the autumn months, and yellow fever in summer. Similar variation occu to some extent among the different races of men, and to a st greater degree among the different genera and species of the ar mal kingdom and insects. Thus rodents and ruminants are su ceptible to anthrax, but cats, dogs and swine are almost whol exempt from it. Rodents are particularly liable to plague, ins much that in China and the Himalayas it is called rats' diseas but mice, cats, monkeys, pigs, and probably sheep, goats, do and other animals are subject to it; and it may also be commu cated by flies. Cholera affects birds, and, like typhoid fever a dysentery, is liable to be spread by flies. Cows are subject scarlet fever, communicable to children by the milk, contaminat with exfoliations from the bag and udders, or otherwise. Sma pox is essentially a cow disease, first described as being transm sible to man by Jenner, in 1796, and who, six years thereaft proved that cowpox in man is protective against smallpox, a smallpox protective against cowpox. This knowledge was t foundation of the protective power of vaccination: the most u versally accepted truth known to preventive medicine, and practice as a life-saving measure unequaled by any other.

The germs of all infectious diseases, besides the scales or e foliations of a number of them, containing the germs, are subj to being air-borne. Tinea, favus, scarlet fever, measles, sma pox and typhus fever exfoliate infinitesimal scales; typhoid fe and diphtheria, and most of all, tuberculosis, in the sputum, en secretions which dry into dust, and, like the exfoliations of t

exanthematous diseases, is liable to lurk in the bedding, clothing and carpets, and float in the air of rooms where these diseases have occurred, indefinitely, rendering them continuously liable to communicate their respective contagions to newcomers, so long as they remain undisinfected and unexposed to the air and sunlight.

Virulent and granular ophthalmia, though most usually spread by direct contact with the pus or epithelium cells, by means of towels, and erysipelas and hospital gangrene in a similar manner, by the dressing materials, are also disseminated through the air by the dried disintegrations of pus and putrifying particles; and the more, if the air of the wards for those diseases is not kept as thoroughly dry as possible. It has been abundantly demonstrated by experience that these diseases most frequently occur in damp and dark abodes or hospital wards—in those wards where the floors are too frequently wet—instead of which they should be rubbed, indeed, forcibly *scrubbed* with dry rubbers. So, too, the furniture and walls.

In this respect it is well to remember the practical lesson of the significance of ammonia—ammonia being a common result of the putrefaction of organic matter in the atmosphere as well as otherwise—given by Dr. Angus Smith a few years ago:*

"When a room is shut up, even for a day, unless that room be very large indeed, there is always that peculiarity observed by sensitive persons to which would be given the name of closeness. Yet there are people who do not seem to observe this, and who spend their lives in rooms in which this closeness may be constantly observed. I have often reflected on this peculiar condition. Surely if oxygen removed all impurities these impurities ought to have been removed, since the oxygen of the air is never absent from the rooms, except to such a small extent that the estimation of the change is extremely difficult. If we lift up a window and allow the air to blow into the room so as to replace the original air, we do not at all times attain efficient aeration. It takes but a few minutes, in a climate where there is considerable motion in the air, to renew the atmosphere of a room entirely. We may judge of this by making a trial upon a visible atmosphere, viz., one pretty well filled with smoke. We see how rapidly with an open window every trace may be removed from the farthest corner, and yet this new air is not sufficient to refresh the room, and closeness is the characteristic still complained

* Address on "Air as a Sanitary Agent," at the Sanitary Institute of Great Britain.

of. It is the custom in well-regulated houses, not to renew merely the air, but to cause the air to blow through the house for a considerable time every day when the weather permits it. Knowing this, for a long time I wondered very much what was the reason. Sure, I said, there was vital air enough without the long-continued current. Looking further at this subject it occurred to me that really clean houses were preserved in this condition by something more than currents of air generally, and that good housewives resorted to the practical methods of rubbing by hand, and it seemed clear that no furniture could be preserved from the peculiar condition of mustiness in any house where the doors and windows must be frequently closed, unless the absolute removal of certain substances from the surface were resorted to. And what was this substance that required to be removed? I supposed it to be one of organic origin. If organic matter is everywhere, the presence of ammonia is everywhere possible; and if that matter is decomposing ammonia is everywhere present, that is the general statement which this paper illustrates. It is now many years since it was observed by me that ammonia could be found on surfaces exposed to exhalations from human beings; but it is not uutil now that the full significance of the fact has shone on me, and the practical results that may be drawn from it in hygiene and meteorology. These results are that ammonia may be an index of decayed matter. This does not apply to the substances which may be called germs, whether it be possible to see them or not, because they are not bodies which have passed into the ammoniacal stage, although some of them may be passing—those, for example, which are purely chemical and exert what we may call *idiolytic* action.

"As a part of the atmosphere ammonia touches all substances, and can be found on many; it is in reality universally on the surface of the earth in the presence of men and animals, perhaps attached more or less to all objects, but especially to all found within human habitations, and, we might also add, with equal certainty, the habitations of all animals.

"This ammonia on the surface is partly the result of decomposition continually taking place, of organic matter adhering to everything in dwellings. The presence of organic matter is easily accounted for; but it is less easy to detect than ammonia. It is probable that the chief cause of the presence of ammonia on surfaces in houses and near habitations is the direct decomposition of organic matter on the spot. If so, being more readily observed

than organic matter itself, it may be taken as a test, and the amount will be a measure of the impurity."

But besides the maintenance of such conditions of the domicile, as those here referred to, favorable to the propagation of infectious diseases, they are well known to be variously communicable by foul water, food, soil and dirty clothing, through the skin or mucous membrane, without any breach of the continuity of the surface, and by respiration; and by inoculation the conveyance of the germ, or the morbid material containing it, either directly by actual contact with the body of the diseased person, or indirectly by means of some instrument or other article from the affected to the unaffected person, an essential feature of the process being some breach of surface in the skin or mucous membrane.

While some diseases are only capable of being transmitted by inoculation, others are both infectious and inoculable. That all infectious diseases depend upon and are communicable by living germs, capable of growing and multiplying within the bodies of men and animals, is verified by the life history of such germs as have been discovered and carefully studied. All possess marked periods of development, maturity and greatest vigor, and a period of decline ending in death. The period of development marks the period of incubation.

Incubation is an exceedingly important feature in all infectious diseases, so far as known. It is that period which elapses between actual infection and the appearance of the first symptoms of the disease. This period varies considerably as regards different diseases, ranging from a few hours, in the cases of some of them, to several weeks in the case of others. The following table is an approximate statement with regard to the diseases named:

	Period of Incubation.	*Duration of Infectivity.*
Disease.	*Days.*	*Weeks.*
Bubonic plague.....	2 to 7	4
Chickenpox	10 to 14	3
Cholera	1 to 5	3
Diphtheria	1 to 8	2 to 8
Diarrhea	1 to 4	1 to 2
Enteric fever.....	8 to 14	6
Erysipelas	1 to 5	1
Influenza	1 to 4	3
Measles	8 to 20	4
German measles.....	6 to 14	3

Pneumonia (Croupous)..	5 to 7	During course of disease.
Mumps	14 to 22	3
Scarlet fever.....	1 to 6	6 to 8
Smallpox	12	6
Tuberculosis	Unknown.	During course of disease.
Typhus fever.....	6 to 14	4
Whooping-cough	4 to 14	8
Yellow fever.....	2 to 5	3

THE CONTROLLING INFLUENCE OF ENVIRONMENT IN EPIDEMIC INFECTIOUS DISEASES.*

By J. W. McLaughlin, M.D.,
Professor of Medicine, Medical Department University of Texas, Galveston, Tex.

The knowledge which has been acquired in the past thirty years, directly and indirectly, from the pursuit of bacteriological studies, has probably done more for the advancement of medicine than has been accomplished within the past hundred years by knowledge derived from all other sources. A comparison of the present scientific status of bacteriology with that which it occupied only a few decades ago, will show not only the marvelous growth of the science, that this resulted from discovery of facts in this branch of learning following other discoveries of similar truths in rapid succession, but that the human mind does not receive and fully comprehend the scope and relations of important and far-reaching facts when they are presented in such rapid succession. It would, indeed, be strange if many of the discoveries in bacteriology have not been displaced in the mind of observers by more recent discoveries, before the former had been thoroughly digested. Indeed, the failure, as I believe, to fully appreciate the effect of attenuation of micro-organisms—(discovered by Pasteur in 1850)—upon the development and type of infectious diseases has furnished the theme of this paper.

Long before infectious epidemic diseases were known to be caused by an invasion of pathogenic micro-organisms, the influences of climate, season, sunlight, cleanliness, etc., in modify-

*Read at the meeting of the Austin District Medical Society, December 22, 1903.

ing the type of the disease, or epidemics, even in preventing them, were clearly recognized, and the term "epidemic condition of the atmosphere" was often used to describe a condition favorable to the spread of an epidemic. Exactly how environmental influences modified the type of epidemic diseases, for example, smallpox and yellow fever, was not then understood, and even now the mildness in the type of smallpox, which has recently prevailed somewhat extensively in many of the States, has been ascribed by writers to changes wrought within the main body, rather than to environmental conditions without the body.

That the remarkable mildness in type, in the recent epidemic of smallpox, is not solely due to immunizing conditions, which have been produced in people of this age by a thorough enforcement of general vaccination measures, is borne out by the following facts: First.—Vaccination gives protection only to persons who have been vaccinated; the protection is in no degree transmitted to their children, and could not, therefore, modify the virulence of smallpox in those people. Second.—Mild and severe epidemics of smallpox have appeared at times before vaccination was known. "The virulence of the smallpox agent—(Immermann, 'Nothnagel's Encyclopædia of Practical Medicine')—is in all probability very variable, as is assumed for other disease poisons (scarlet fever virus, etc.). Besides the different degrees of individual susceptibility, this second factor has a marked influence on the severity of prevailing smallpox cases. This difference of virulence was most clearly expressed in the pre-vaccination period, in which mild and grave smallpox epidemics were distinguishable, just as we now distinguish mild and severe epidemics of scarlet fever, measles, etc., the varying character of which can be explained only by the assumption of a temporary difference in virulence of the exciting principle." O. J. Potter calls attention (Osler's "Practice of Medicine") to the fact that John Mason Good, in his "Study of Medicine," describes a number of very mild outbreaks of smallpox, some of which were mistaken for chickenpox. Sydenham, in the seventeenth century, stated that "smallpox has its peculiar kinds, which takes one form during one series of years, and another during another."

It is a matter of history that upward of a hundred years ago yellow fever, often of malignant type, appeared in epidemic form, and in a succession of years, in New York, Philadelphia, Boston, and along the Atlantic seaboard, in every town of commercial importance from Maine to Florida.

La Roche says that (Sternberg, "Twentieth Century Practice, Medical Supplement") "Dr. Rush and others laid great stress upon a quantity of damaged coffee which was exposed, during the latter part of July, in a place (on the wharf and adjoining dock) in Philadelphia, and under circumstances which favored decomposition. Its smell was highly putrid and offensive, insomuch that the inhabitants of the houses in Water and Front streets, who were near it, were obliged in the hottest weather to exclude it by shutting the doors and windows. Every person who only walked along these streets complained of the intolerable fetor, which upon inquiry, was constantly traced to the putrid coffee."

Yellow fever has disappeared from the latitudes of Philadelphia and Boston, and there has been no epidemic of the disease there since 1802, and, although it has been carried there time and again since that date, the disease will no longer develop. Are the conditions once favorable to the development of yellow fever but now unfavorable, due to environmental changes, or to a disappearance of the intermediate host (the *Stegomyia fasciata*). A case in point, the disappearance of malaria from England, will perhaps, afford an answer to this inquiry. Nutall, L. Corbett and Strangeways Pig (Marchiafava and Bignami, "Twentieth Century Practice, Medical Supplement") who have gone into this subject, have reached the following conclusions: First.—The disappearance of malaria from England is not due to the disappearance of the malaria-bearing mosquitoes. Second.—*A. maculipennis, A. bifurcatus, A. nigripes* are found in districts that were once malarial as well as in non-malarial districts. Third.—The disappearance of malaria is due to improved drainage, the reduction of the population in malarial districts, and the general use of quinine.

In Italy, Celli and Gasperina pursued researches in the Tuscan Maremma, in which there are *anopheles* but no malaria. People fell ill there from fever acquired in neighboring localities, as Sardinia, who might infect the mosquitoes, but the fact remains that autocthonous malaria does not occur.

The failure of yellow fever to spread into epidemic proportions in San Antonio during the falls months this year, when the opportunities were so very favorable, for example—yellow fever cases and the *Stegomyia fasciata* in great numbers, can, it seems to me, be due only to unfavorable environmental conditions existing at that place.

Now, with this presentation of the subject, I will submit an ex-

planation of the class of phenomena mentioned, based upon a reasonable interpretation of existing knowledge of pathogenic micro-organisms and the relation they bear to infectious diseases. A brief statement of bacteriological facts is necessary to this explanation.

Infectious diseases are caused by micro-organisms which are specific in etiology, in that each kind of disease is caused by a specific micro-organism, and are specific in reproduction, in that they breed true. A micro-organism that is infectious to one species of animal may be innocuous to another species, or to a variety of the same species of animal. Micro-organisms, when suitably environed, are capable of producing in an artificial culture medium, or in the tissues of the human body, specific metabolic products. Those produced in the human body may be, and doubtless are, the essential causes of the specific lesions and clinical symptoms of the resulting infectious disease.

The following list, according to Gotslich, comprises the principal known products obtained by growing bacteria in artificial culture media: CO_2, H_2, CH_4, H_2S, NH_3; nitrates, water, sulphur; volatile substances, trimethylamine, alcohol, formic acid, acetic acid, propionic acid, butyric acid; oxyacids and polybasic acids, lactic, malic, succinic, oxalic and tartaric acids; amides, such as leucine, alanine, etc.; aromatic bodies, tyrosin, phenol, cresol, hydroparacumaric acid, indol; pigments, carbohydrates; peptones; alkaloidal and albuminoid poisonous substances—ptomaines and toxins; and hydrolytic ferments."

It is generally conceded that the pathogenic micro-organisms, which have invaded the animal body, are not the cause of its infection, but this condition is a result of the action of the poisonous substances—toxins and toxalbumins produced, and as they are the essential causes of the clinical symptoms and pathological changes, the virulence of the type of the disease will, therefore, be in direct proportion to the quantity of such poisons elaborated in the tissues of the body.

Now, it has been repeatedly demonstrated that the capacity of a living species of micro-organisms to produce metabolic products in the culture medium in which it grows and multiplies, is not an invariable quantity. On the contrary, this capacity of the micro-organism may be decreased in any degree, even to total extinction, and the condition of attenuation, as it is termed, may be made permanent, temporary, or it may be reversed and the capacity restored without causing apparent injury to the micro-

organism. These important truths are fully discussed by Frank and I shall take the liberty of quoting at some length his remar upon this subject:

"In the year 1880 Pasteur surprised the scientific world by t discovery that under certain circumstances the micro-organisı of chicken cholera lose their virulence, to a greater or less exte without showing any change in their appearance, way of growt etc.

"Toussaint and Pasteur found that anthrax bacilli could deprived of their virulence in like manner; and the same fact h been proved with regard to swine erysipelas, symptomatic anthra the pneumonia bacteria of A. Frankel, and some others.

"This diminution of virulence is the result of two essential d ferent causes. The one which we call the natural cause has ı cently been fully elucidated, particularly by Flugge. It is gradual diminution of infectious power in bacteria which ı compel to vegetate for a long time separated from their natu conditions of growth, on our artificial food media, and under t atmospheric conditions of our laboratories. By a gradual adap tion to the altered, saprophytic way of life, or by a progressi selection of such cells as are naturally more capable of adopti this altered way of life, the original capacity for developme within a foreign body diminished more and more. As an ou ward sign of the change which has taken place, we observe th the culture now shows a much more luxuriant and rapid grow on the lifeless food medium than was at first the case, when t conditions were yet new and strange. Not all the pathoge bacteria possess this power of 'cutting their coat according their cloth' and adapting themselves to outward circumstanc Some cling with marked tenacity to their proper character, whi they do not leave even when compelled to exist for years outsi the body. Others, as the bacilli of glanders, the streptococci erysipelas, Frankel's pneumonia bacteria, the diphtheria baci etc., lose their virulence very rapidly.

"A similar phenomenon was observed in the case of the sapr phytic bacteria. Hueppe and his pupils have shown, for instan that the sour-milk bacillus, when bred continually and uninte ruptedly on our artificial foods, lose the capacity for effecting t changes from which they take their names, and Hueppe ev speaks of this as a loss of virulence in the micro-organisms.

"It lies in the nature of things that this diminution of virulen takes place gradually, proceeding step by step, and not with o

great leap. Therefore, we are often able to interrupt the process at a certain stage, or even to retrograde and undo the work already done. The best, and indeed the only, means to this end is to give back to the partially weakened cells their natural conditions, and endeavor to re-accustom them once more to their former way of life.

"In the case of pathogenic species, we attempt to inoculate them into the animals most susceptible to them. If this fails, we can have recourse to methods of increasing the natural susceptibility of an animal artificially. Should this prove successful, and the micro-organism once more establish itself on its natural soil, one may reckon with some degree of certainty, on its recovering its former power.

"In direct contrast to the phenomena hitherto discussed, is a second mode of diminishing the virulence of micro-organisms, which leads to the same final results. That which brings about the diminution is, here, not the long-continued influence of altered (but not necessarily worse) conditions of life; it is the action for a short time, of influence directly prejudicial to the bacterial protoplasm.

"In fact, all the means employed to produce artificial diminution of virulence in pathogenic bacteria are such as, if applied in a slightly stronger form, would cause the destruction of the cells, and would kill their contents.

"Thus we breed bacteria in media to which a certain quantity of antiseptic or disinfecting substance has been added, but which just allows the microbes to exist and grow upon them. Such, for instance, as the process of Roux and Chamberland for diminishing the virulence of anthrax bacillus, by cultivating it in a bouillon with the addition of bichromate of potassium (1 to 5000 to 1 to 2000); and that of Toussaint, by mixing about 1 per cent. of carbolic acid with blood containing anthrax bacilli.

"In a similar manner—*i. e.*, as a disadvantageous form of nutrition—the organism of certain animals is found to act, namely: those animals which are insusceptible, or but little susceptible, to the particular kind of bacteria which we desire to weaken. Thus the bacilli of swine erysipelas lose their virulence to a certain extent when passed several times through the bodies of rabbits, as has been proved by Pasteur and Kitt.

"Chauveau robbed the anthrax bacilli of their poisonous property, by breeding them under a pressure of eight atmospheres, and

Airlong found that 'sunlight is capable of weakening these sam bacilli, and even their spores.'

"By far the surest and most commonly used procedure is th exposure of the micro-organisms to the influence of high tem peratures.

"Toussaint kept blood containing anthrax bacilli for ten min utes at 55° C. The bacilli were by no means killed by the hea yet they were rendered harmless by it. Pasteur, for his experi ment on a large scale, employed a considerably lower degree o heat, but he had not given full particulars of his method, so tha no definite judgment can be formed regarding it. We, therefore owe our thanks to Koch and his coadjutors, who once more ap proached this question in a methodical, strictly scientific course o experiments, with a view to ascertain the effects of heat in dimin ishing bacterial virulence by studying the anthrax bacillus—th best known and most suitable species for this purpose.

"Koch, Gaffky and Loeffler found that at 45° C. a diminutio of virulence was perceptible in the cultures.

"They further discovered the important fact that the lower th temperature is by which a diminution takes place, the longer takes for such diminution, but at the same time the more per manent are the effects.

"Even variations of a fraction of a degree are here importan While anthrax bacilli can be rendered perfectly harmless in nin days with 43° C., it requires twenty-four days if we only emplo 42.6° C.; but in this latter case the new quality of the bacter has become so thoroughly a second nature to them that they can not throw it aside again. They not only keep it throughout the own life, but they even transmit it to their progeny. In fact, w can breed from them as many generations as we will of ful harmless bacteria.

"If we endeavor to diminish virulence under the influence higher temperature more quickly—in a few days—the bacter regain it with proportional rapidity.

"But their virulence cannot be destroyed at one blow. Befo the micro-organisms part with it completely they pass through number of intermediate stages, each of which, with the amou of virulence still remaining, is sufficient to affect certain anima the efficacy of the poison remaining longest for those most su ceptible to it. Bacilli of twenty days will kill guinea pigs; tho of ten days, rabbits; those of six days, sheep, etc.; and this d

gree of partially diminished virulence can also be preserved throughout generations of cultures.

"And even if the above statements may not, perhaps, always be borne out in practice with perfect exactitude in all cases, that does not change the incontestably proven scientific fact that bacteria of a high degree of virulence may lose this quality for a longer or shorter time, or even permanently, and to any extent, up to its complete extinction.

"Something similar has been observed in the saprophytic species also. Many pigment bacteria, under the influence of high temperature or of culture media little suited to them, lose the faculty of forming coloring matter, and sometimes do not regain it under normal circumstances until after a considerable lapse of time.

"Why can the former grow and multiply in the bodies of susceptible animals and the latter cannot?

"The circumstance that all the influences which rob the bacteria of this, their (to us) most important capacity, are such as are injurious and hostile to them would lead to the supposition that an extensive degeneration of the cell protoplasm took place, which would show itself in other places also. Yet this is found to be the case to a very limited extent only. The harmless anthrax bacillus has the same appearance and the same forms as the normal anthrax; its separate members show the same formation; the contents are as clear as crystal and homogeneous; the rods are motionless; they divide and produce spores, as before. On the gelatine plate and in the needle-point culture, we observe the same sort of growth; in short, there are no really striking differences."

The conclusions which follow this statement of facts will be summarized as fellows:

First. The pathogenicity of micro-organisms is not a constant, invariable quantity.

Second. The pathogenic activity of a micro-organism varies directly with its capacity to manufacture disease-producing substances—toxins and toxalbumins.

Third. The capacity of micro-organism to manufacture toxins or toxalbumins is affected by certain natural and artificial agencies; the change effected in the micro-organism is called "attenuation."

Fourth. The agencies or means used to attenuate germs, that is, to decrease their pathogenic activity, are unfavorable culture

media, or are conditions of life in which the germs are compell to grow.

Fifth. Sunlight is a powerful, natural attenuating agent.

Sixth. In the light of these facts I feel justified in the bel that there are other natural means of attenuating the micro-orga isms of disease, and, in this way, of modifying the type of e demics, or of preventing their development.

The environmental conditions, for example, of cleanliness the person, of the home, and of the municipality; of pure air the home, the office and place of business, in the schoolroo church, and in all places where people congregate and germs fi a breeding place; of drainage, temperature, humidity, altitude a climate, are believed to be very important factors in determini the growth and the physiological capacity of germs to manufa ture disease-causing poisons.

I also recognize, but will not discuss at this time, the influen of environment in effecting the individual resistance to diseas the important rôle of mosquitoes and other insects in transm ting the germs of disease from the sick to the well, and the pc sibility that they, under certain unknown conditions, may, the selves, attenuate the germ they transmit, and in this manner m modify the type of the disease thus caused.—"Texas Medi Journal," January, 1904.

CIDER AND JAM IN ENGLAND.—During the past two or thr years there has been a great revival of the cider trade. Cider now being recommended by doctors for rheumatism and go and it has become quite a popular drink. The cider of Engla is usually very good, and is attractively put up. There is no re son why the United States should not get a good share of th trade. It is said that much of the cider for this season's consum tion will be made from Canadian apples; in some cases, the appl being cut up and dried in Canada and sent to Devonshire a Herefordshire and submitted to a process to produce "hom made" cider. The jam trade in England is suffering from t increased price of sugar and the failure of the English fruit cro Jam pulp is being sent from Canada to be put up by local man facturers, and a large trade in French and German jams is e pected.—James Boyle, Consul, Liverpool, England, October 1903.

PROTECTION OF WATER SUPPLIES.

THE LINES OF DEFENCE.*

By J. CARTWRIGHT, M. Inst. C. E., Bury.

In recent years, in connection with matters of water supply, the tendency with large communities has been to go further away from the place of consumption, and this course is being rendered increasingly imperative, owing to the growth of the population.

For those towns which can afford to go considerably beyond, to the uninhabited areas, this problem is not so acute, for at present there are nearly 4,000 square miles of wholly uninhabited land in large connected areas in England and Wales, of which 1,400 square miles are found in the mountains of Wales, a like area in the higher moorlands of the Penine chain, and 300 square miles in the Lake District. Over the whole of this area there is a very heavy rainfall, and the districts in question are well adapted for use as gathering grounds; the remainder of the ground is partly high land on the chalk and limestone ranges of southern and eastern England, partly fen and alluvial land, which is comparatively useless for gathering ground—chiefly on account of its low level—and a considerable portion of those eligible areas have already been secured for existing and projected waterworks. But for many authorities the only available sources of supply are not so favorably situated. The land from which the water is collected is largely arable, or, it may be, is sparsely inhabited, and to abandon the works which have been constructed and developed at considerable cost from time to time, as occasion arose, and go elsewhere, is altogether impracticable. Too often, in the past, sources of supply have been selected without any special regard to the character of the land over which the water flows, and very frequently drainage areas have been fixed upon rather on account of their proximity to the district to be supplied, or to their available yield, than on the quality of the water obtainable.

Before expressing an opinion as to the best means of protecting our water supplies, it is, perhaps, necessary that I should point out the possible sources of pollution from which they require to the

*Presidential Address before the Manchester Association of Students of Institution of Civil Engineers, November 18, 1903.

be protected. It has been proved that at altitudes where hig clouds form, the atmosphere is so pure that rain water may b considered as being normally free from bacteria and chemicall pure, and that it is only when it passes through the lower atmos pheric strata, over inhabited districts, that contamination begin: However uninhabited the watershed may be, and the freedom fro bacteria which the rain may possess, when it reaches the surfac of the ground it immediately becomes liable to pollution of variou kinds—animal, vegetable and mineral—in various degrees, de pending upon local circumstances; but the dangers arising fro absorption by water of such salts and minerals as render it unf for domestic purposes are not so serious as those derivable fro the organized growths that abound in water tainted with decom posing vegetable or animal matter. All surface waters contai micro-organisms that subsist upon dissolved or suspended sub stances, although the quality of a water exercises a powerful in fluence upon the growth and predominance of particular specie among those that inhabit it; and it is worth noting that wate which has percolated to some considerable depth, while it may b chemically impure, is often practically free from bacteria, unles it is mixed and contaminated by surface water reaching it direc through fissures, and that, too, even when the surface soil is highl charged with them. But we are not concerned at present in deal ing with waters obtained from deep wells. A fertile source c pollution arises from the manuring of land with artificial manure: such as putrid fish and guano, which are more to be feared eve than any natural manures; and it is doubtful whether any dange is to be apprehended from cattle grazing on the watersheds, for i is not yet conclusive that certain diseases common to cattle ar communicable to man.

Without question, however, the pollution which is most dan gerous to man is that produced by himself. The untreated ex creta of the human being is always a source of danger, but when i proceeds from a diseased human being it carries with it germ which may easily be communicated to others, and produces disas trous results. Hence the danger arising from the presence o human dwellings on the areas from which our water supplies ar obtained, especially if they are situated in the immediate neighbor hood of the streams or intakes; for while it is true that a distinc increase in the number of organisms is invariably to be found i the proximity of human habitations, the real danger is not du so much to the increased number (all of which may be harmless

as to the proportionate increase of the probability of the presence of such as may be pathogenic and prejudicial. Many cases of serious outbreaks of typhoid, cholera and other diseases have been clearly traced to such sources of pollution; especially is this danger aggravated if the water is drawn direct into the mains from the stream or feeder at a point immediately below human dwellings, or from *small* reservoirs; for it is well known that large storage reservoirs not only facilitate sedimentation in the removal of suspended solids and mineral matter in solution, but also effect a very considerable bacterial improvement, especially if flood waters, containing large quantities of decaying vegetable matter, such as leaves and peat, are excluded; and although it is generally believed that running water, after a few miles of flow, will purify itself a high degree, the amount of purification that takes place naturally, such as by oxidization by air and light, is comparatively limited, so far as the disappearance of disease germs is concerned. Their dispersion through the mass of the water and the greater dilution caused by the increasing volume of flow, are probably the greatest factors in the apparent lessening of pollution; and in this country—especially in Lancashire—the streams, except where the topographical conditions are not favorable for the development of large industries, almost invariably receive such quantities of trade refuse and effluents as to stamp them as altogether impossible sources of water supply before they have become sufficiently large to be of value as such.

There are other sources of pollution which I need not allude to, because for the most part they may be controlled and eliminated by the agency of those in direct charge of water undertakings; but, having pointed out some of the principal sources and the liability of our water supplies to contamination, and the possibilities arising from such, the question now presents itself for consideration: How may we protect or safeguard them?

At present the law does not give sufficient protection. Since 1847 there has been no general legislation for the protection of the gathering grounds of waterworks, as distinguished from other watersheds, and while the Rivers Pollution Act, 1876, applies to all rivers and watercourses, it does not contain any special enactments with reference to rivers and streams on which we are dependent for our water supplies; and it might with advantage be made more stringent and effective in preventing the fouling of water intended for domestic purposes, by enforcing penalties in cases of pollution and the supply of unwholesome water.

be protected. It has been proved that at altitudes where high clouds form, the atmosphere is so pure that rain water may be considered as being normally free from bacteria and chemically pure, and that it is only when it passes through the lower atmospheric strata, over inhabited districts, that contamination begins. However uninhabited the watershed may be, and the freedom from bacteria which the rain may possess, when it reaches the surface of the ground it immediately becomes liable to pollution of various kinds—animal, vegetable and mineral—in various degrees, depending upon local circumstances; but the dangers arising from absorption by water of such salts and minerals as render it unfit for domestic purposes are not so serious as those derivable from the organized growths that abound in water tainted with decomposing vegetable or animal matter. All surface waters contain micro-organisms that subsist upon dissolved or suspended substances, although the quality of a water exercises a powerful influence upon the growth and predominance of particular species among those that inhabit it; and it is worth noting that water which has percolated to some considerable depth, while it may be chemically impure, is often practically free from bacteria, unless it is mixed and contaminated by surface water reaching it direct through fissures, and that, too, even when the surface soil is highly charged with them. But we are not concerned at present in dealing with waters obtained from deep wells. A fertile source of pollution arises from the manuring of land with artificial manures, such as putrid fish and guano, which are more to be feared even than any natural manures; and it is doubtful whether any danger is to be apprehended from cattle grazing on the watersheds, for it is not yet conclusive that certain diseases common to cattle are communicable to man.

Without question, however, the pollution which is most dangerous to man is that produced by himself. The untreated excreta of the human being is always a source of danger, but when it proceeds from a diseased human being it carries with it germs which may easily be communicated to others, and produces disastrous results. Hence the danger arising from the presence of human dwellings on the areas from which our water supplies are obtained, especially if they are situated in the immediate neighborhood of the streams or intakes; for while it is true that a distinct increase in the number of organisms is invariably to be found in the proximity of human habitations, the real danger is not due so much to the increased number (all of which may be harmless)

as to the proportionate increase of the probability of the presence of such as may be pathogenic and prejudicial. Many cases of serious outbreaks of typhoid, cholera and other diseases have been clearly traced to such sources of pollution; especially is this danger aggravated if the water is drawn direct into the mains from the stream or feeder at a point immediately below human dwellings, or from *small* reservoirs; for it is well known that large storage reservoirs not only facilitate sedimentation in the removal of suspended solids and mineral matter in solution, but also effect a very considerable bacterial improvement, especially if flood waters, containing large quantities of decaying vegetable matter, such as leaves and peat, are excluded; and although it is generally believed that running water, after a few miles of flow, will purify itself a high degree, the amount of purification that takes place naturally, such as by oxidization by air and light, is comparatively limited, so far as the disappearance of disease germs is concerned. Their dispersion through the mass of the water and the greater dilution caused by the increasing volume of flow, are probably the greatest factors in the apparent lessening of pollution; and in this country—especially in Lancashire—the streams, except where the topographical conditions are not favorable for the development of large industries, almost invariably receive such quantities of trade refuse and effluents as to stamp them as altogether impossible sources of water supply before they have become sufficiently large to be of value as such.

There are other sources of pollution which I need not allude to, because for the most part they may be controlled and eliminated by the agency of those in direct charge of water undertakings; but, having pointed out some of the principal sources and the liability of our water supplies to contamination, and the possibilities arising from such, the question now presents itself for consideration: How may we protect or safeguard them?

At present the law does not give sufficient protection. Since 1847 there has been no general legislation for the protection of the gathering grounds of waterworks, as distinguished from other watersheds, and while the Rivers Pollution Act, 1876, applies to all rivers and watercourses, it does not contain any special enactments with reference to rivers and streams on which we are dependent for our water supplies; and it might with advantage be made more stringent and effective in preventing the fouling of water intended for domestic purposes, by enforcing penalties in cases of pollution and the supply of unwholesome water.

Some other method of protection must, therefore, be adopted meantime, and it is interesting to notice the different steps taken by water authorities in this country, and also abroad, to attain this end. Germany depends upon filtration alone, and has spent millions in purifying turbid and polluted river waters; France and Austria have striven for mountain spring waters, and have built hundreds of miles of costly aqueducts to secure them; and in the United States, where the importance of protecting the gathering grounds is widely recognized, more favor is shown to making regulations and legal enactments for their protection than in owning them, and in several of the States very stringent measures have been adopted and are imposed. In this country, however, recent efforts have been directed to the purchase of the watersheds, thus securing their complete control and management entirely in the interests of the water consumer, which is certainly much more effective than protecting them by legal enactments.

Manchester was among the first authorities which acquired powers for purchasing the watersheds, although I claim for Bury the distinction of being the first to carry into effect the objects aimed at in thus securing complete control over them; and no doubt the experience gained by the Manchester Corporation in the Longendale Valley induced them to buy up the whole of the watershed draining to Thirlmere, extending to 11,000 acres. The corporation have since been amply justified in their action, more especially as the water is laid on direct from the lake to the consumers. Liverpool possesses the power to acquire the Rivington, as well as the whole of the Vyrnwy, watershed, the latter extending to 22,000 acres, notwithstanding that provision is being made for the whole of the water to be filtered. Birmingham has similar powers over the watersheds of its new supply from the rivers Elan and Claerwen, in Mid-Wales, reaching to 45,000 acres, of which 40,000 consist of open mountain pasture and moorland, carrying not more than one sheep per acre. Glasgow has adopted a different course, by entering into an arrangement with the landowners not to lease land for building purposes around Loch Katrine, nor within a drainage area extending to 20,000 acres; while Edinburgh, although it has a very complete system of filtration, and obtains its water from moorland very sparsely inhabited, protects its watersheds by contracts with the proprietors of the land and by legal enactments.

Other places might be enumerated which have adopted this precautionary measure, but there are many more which depend

solely upon the efficiency of sand filtration. London may be cited as the chief example of this class, the Thames water, after extensive sand filtration, forming the principal supply; and in this case the area above the intakes is far from being uninhabited or uncultivated. Indeed, if one is to judge the merits of the two methods solely by a comparison of the prevalence of communicable diseases, like typhoid, or the death rate of those towns which represent both, his verdict must be in favor of the latter method. The typhoid case rate of London, for example, is remarkably low, being seventy-two, as compared with an average of 115 per 100,000 per annum for 219 towns in England, and there is no evidence to show that it has suffered to any appreciable extent from drinking the water drawn from a tainted area. The water supply of Hamburg is another instance of river water, after filtration on scientific principles, being chemically and bacteriologically as pure as it is practicable to obtain, and it must be conceded that those towns which drink river water, and depend upon the efficiency of filtration for its quality, are, generally speaking, the most immune from enteric fever. The conclusion from this evidence is, that bacterial purification in sand filtration, if carried out under skilled supervision, is effective in reducing pathogenic organisms, although it does not absolutely prevent their passage into the filtered water. Much depends upon the efficiency of the filter, which, unless properly constructed and worked, may be productive of more harm than good; several epidemics have been traced to the use of filtered water which had been polluted before filtration, showing that the filters had failed to remove the impurities, and that it is unsafe to rely upon them alone; and cases are not unknown where water has been grossly contaminated by being passed through filters. The health of towns and cities like London and Hamburg is largely dependent upon the thoroughness and efficiency with which the filtering of the water is carried out. If through carelessness or accident the water were allowed to pass unfiltered, or the filtering media of one filter-bed were allowed to become cultivation areas for pathogenic organisms, the result would soon be apparent in an epidemic—a condition of affairs which is not ideal.

It seems to me that, to prevent all possibility of pollution to our water supplies at their source, it is necessary for water boards or authorities—whose imperative duty it surely is to ensure this—to have full control over the watershed areas from which their supplies are obtained, and, where possible, to divert or stop up all pub-

lic roads and footpaths. Where this is impracticable, to make pro vision for the drainage from public roads to be carried below th storage reservoirs or intakes, to clear all human dwellings off th catchment areas, and, as far as possible, prevent the incursion c tramps and others over them, and while utilizing them as pastur lands to prevent, by fencing, the access of cattle to the feeders c streams, and to take precautions against decaying vegetable ma· ter being carried during floods into the storage reservoirs. Th· constitutes the first line of defence, and, if perfectly maintainec there will be absolutely no need for further precautions. But, ur fortunately, it is difficult, and increasingly becoming so, if not a together impossible, even while possessing full control over th catchment areas, to prevent a certain amount of trespass by pec ple who, as in the case of the Maidstone epidemic, may be th means of polluting an otherwise wholesome source of suppl: Recourse must, therefore, be also had to a second line of defenc that is, efficient filtration, not as we usually see it carried out i this country, but conducted on scientific principles, under comp· tent supervision and systematic and frequent inspection. To son this will doubtless appear altogether unnecessary, although in in perial affairs the wisdom displayed in providing a second line · defence, in view of the possibility of the temporary or comple failure of the first line, is seldom questioned, and surely the pr· tection of the first necessity of life is as important as that of n tional prestige. At all events, it is the policy that is being ca ried out by the Bury and District Water Board, to which I a the responsible adviser, and also by important water authoriti like Liverpool, Birmingham, Leeds, and others; and as the da ger of relying exclusively on one or other of the systems is appr hended, the more enlightened policy of adopting and efficient maintaining both will be proportionately and increasingly pursue

THE ALLEGED INJURIOUS EFFECTS OF PRESER' ATIVES IN AMERICAN MEATS AND DRIED FRUITS IN GERMANY.

Report of United States Deputy Consul-General Hanauer, Fran fort, Germany, October 3, 1903.

Protests against the action of police authorities in seizing · forbidding the sale of American dried fruits because they co tain an admixture of sulphuric acid are made in the annual r ports of many chambers of commerce throughout Germany. Tl chambers claim that not a single case has occurred where inju

resulted from said admixture. On the contrary, it is said it helps to preserve the fruits, which are a popular article of food. The Chamber of Commerce of Mannheim, in conjunction with many other chambers of commerce, addressed the imperial sanitary bureau at Berlin on the subject of "American dried fruits" and the police orders inhibiting their sale. The chamber refutes the allegation that the use of sulphuric acid as a preserving means is injurious, and petitions the sanitary bureau to fix the amount of acid allowable in the preservation of these fruits, which are a necessary article of consumption.

The report of the Mannheim Chamber of Commerce speaks also of the scarcity of the meat supply and the greatly lessened consumption of beef and pork, owing to their high prices forcing the working classes to eat horse flesh.

The report of the chamber of commerce for the State and city of Hamburg says on the subject of the restrictions on the importation of meats that they are Agrarian measures, instituted for the purpose of forcing high prices for domestic meat, and are not justifiable on sanitary grounds. It mentions particularly "corned beef," against which nothing can be alleged as being hurtful to consumers, and it quotes the opinions of experts to show that the small amount of boracic acid used for the preserving of the meat is not injurious and is actually indispensable. The chamber instituted inquiries among the Hamburg shipowners, who said that since foreign canned meats have been used on their vessels the health of the crews has been much improved, but after trial it was found that the canned meat put up in Germany is inferior to the foreign article. The report further expresses the hope that the Federal Government will soon realize the fact that by keeping out cheap foreign meat a serious injury is done to the working classes of Germany and that such injury must create intense feeling and strengthen the Social-Democratic party.—Consular Reports, January, 1904.

DISINFECTING APPARATUS.—A new apparatus, of French origin, is based upon the evaporation of formic aldehyde. The solution of formic aldehyde is boiled in a vessel heated by spirit or other lamp, the escaping vapors being led through a tube made flexible, so that it can be passed through the keyhole of the door of the room to be disinfected. A gauge shows the level of the liquid, and scales are provided to show the amount of liquid to be evaporated to disinfect the room properly.

OTHER SOURCES OF TYPHOID INFECTION THAN THROUGH THE MEDIUM OF DRINKING WATER, AND HOW TO GUARD AGAINST THEM.*

By SEALE HARRIS, M.D., of Union Springs, Ala.

I am very glad, indeed, that our president, in assigning my theme as one of the "regular reporters" for this meeting of the State Medical Association, selected that of "Other Sources of Typhoid Infection Than Through the Medium of Drinking Water, and How to Guard Against Them," because from my observation, and from the recent researches made in large epidemics of typhoid fever, I am convinced that the medical profession greatly exaggerates the part that drinking water plays in the dissemination of that disease. The subject is, therefore, a "congenial" one to me.

Sanitarians, in writing learned theses on the etiology of typhoid, are wont to make such statements as the following: "Show me a city's mortality statistics from typhoid, and I will tell you the character of its water supply," and "from any given case of typhoid fever the cause can, and should be, discovered"; but the fact remains that in very many epidemics, and in more of sporadic cases, the cause is frequently from other sources than drinking water, or it is not discovered at all. Recent investigations seem to show that, except in the cities, the germs of typhoid are disseminated more in other ways than through the medium of drinking water. I do not mean to deny that typhoid fever is largely a water-borne disease, but in this article I am not expected to discuss its spread through drinking water—all of us know too much about that side of the question—though in considering the other sources of typhoid infection, I shall mention some methods of conveying the disease where polluted water is indirectly the cause, though the infection is not taken into the system in drinking water.

The great epidemics of typhoid fever that visited the concentration camps of the United States Volunteer Army during the Spanish-American War, in 1898, were carefully studied by a board of army surgeons, consisting of Majors Walter Reed, Vic-

*Transactions of the Medical Association of the State of Alabama, 1903.

tor C. Vaughan and Edward O. Shakespeare. In 92 regiments investigated there was a total number of 107,973 men; 20,738, or nearly 20 per cent., developed typhoid fever; and of these, there were 1,580 deaths—a mortality rate of 7 per cent. of those who contracted the disease. This board examined the records of all these cases, they visited all the cities where the camps were located, they investigated carefully the source and quality of the water supplies of all the camps, also their food supplies, and the methods of disposing of their excreta—in fact, they investigated everything bearing upon the cause and spread of typhoid fever among our soldiers, more of whom suffered and died from typhoid fever than from Spanish bullets. All the members of this board were sanitarians of renown and great experience, and having been given every possible facility for making investigations, their conclusions are of great value and have almost revolutionized our ideas regarding the origin and spread of typhoid fever. Their report, which was published by the Government, and which may be obtained free by application to the Surgeon-General of the army, is one of the most valuable contributions to the literature of typhoid fever that has been published in years. Their report presents so forcibly some of the facts which I desire to bring out that I shall quote freely from it. Among the general conclusions of this board are the following statements:

"Infected water was not an important factor in the spread of typhoid fever in the national encampments in 1898."

"It may be stated in a general way that the number of cases of typhoid fever in the different camps varied directly with the methods of disposing of the excretions."

According to these distinguished authorities on typhoid, the most active agents in the dissemination of the disease in over 20,000 cases were: Flies, personal contact and dust, though they thought that in some of the camps the drinking water was infected.

There are many sources of typhoid infection other than through the medium of drinking water, the more important of which I shall discuss under separate headings.

Milk.—Infected milk is a fruitful source of typhoid fever. Eberth's bacillus will thrive and multiply in milk without affecting its taste or appearance. It will live for days even in sour buttermilk, and fresh milk is an excellent culture medium for the germ. Some have thought that the germ can be ingested by the cow in drinking water and be excreted in the milk without destroying its vitality. However, this is hardly probable, unless

the cow actually has typhoid fever, and there is no evidence prove that cattle are subject to the disease. It seems possible t the germs might be taken into the stomach in water, and not h ing been destroyed in the alimentary canal of the cow, be excre in the feces, but the germ has never been demonstrated in the creta of the cow. Bacterial examination of milk has frequer shown the colon bacillus, and it seems possible that the typh germ could infect milk in the same way; that is, by the udd becoming soiled with the feces containing the germ.

Milk may be infected in any of the following ways: From udder or teats of the cow, from the hands of the milkman, fr milk can and pans which have been washed in infected wa from milk diluted with infected water by unscrupulous dairym from dust holding in it the typhoid bacillus, and by infected fl

Pastures for cows are commonly located in the marshes a lowlands, where the soil is fertile and the grasses grow luxuriou and the drainage from the surrounding country, or from the to flows into the shallow streams which traverse them. When rains come they wash the sewage into these streams, the pastu are flooded, and puddles of water remain for some time. cows go into the streams for water, or lie down in the pudd which, if infected, can readily in many ways infect the udder teats and eventually infect the milk. If the milkman happens be nursing a case of typhoid fever, and is not as careful as should be in disinfecting his hands, he can easily infect the m A number of cases have been traced to this source. If the n vessels are cleansed in polluted water, as can be done, for instar by washing them in the shallow streams in the pasture, they infect the milk contained in them.

During my college days an epidemic of typhoid fever occur among the students who boarded at a certain hotel, fifteen twenty of whom contracted the disease. They used the sa drinking water that was drunk by more than five hundred ot students. A committee from the faculty was appointed to insp the hotel premises, but nothing was found there that could count for the epidemic. Upon further investigation it was fou that the cows which belonged to the proprietor of the hotel w pastured in a lowland, through which traversed a shallow stre The cows were milked in the pasture; their udders and milk v sels were cleansed in the water from this infected stream. Th had been some cases of typhoid fever in houses located above a near the stream, and evidently the rains washed the excreta i

the stream which flowed through this meadow, thus polluting the water and indirectly the milk. The committee reported that the epidemic was probably due to infected milk, whereupon the proprietor discontinued the use of the milk from the cows which were pastured in this meadow, and no further cases of typhoid developed among the students.

In the towns and villages, most of which have no sewerage systems, the cows are almost invariably pastured in the lowlands of the suburbs of the town, where all the filth and impurities drain directly into the streams that supply the cows with water. It certainly seems reasonable that the milk can become contaminated in some of the ways that I have mentioned, and I am convinced that much of the typhoid fever in such towns and villages, as well as in the rural districts, is due to infected milk.

Flies.—The common house fly has been shown to be a frequent carrier of the typhoid germ. He has for many years been under suspicion of being guilty of that crime, but he has been recently found guilty beyond a reasonable doubt, and has therefore been condemned to death, or to banishment from homes which would be free from typhoid fever.

Majors Firth and Horrocks, two British army surgeons, examined flies, which had been allowed to crawl over typhoid stools mixed with fresh cultures of the bacilli, and all of those examined contained the germs of typhoid on their legs, heads, wings or bodies. It has been supposed that the fly may take the germs into his stomach and give them off in his excrement, but these observers failed to find the typhoid germs in any of the excreta of flies that had been fed on typhoid stools.

The observations of Dr. Alice Hamilton, of Chicago, are of more practical value, and they leave no doubt but that the fly is a carrier of the typhoid germ. During the recent epidemic of typhoid fever in Chicago, she examined the conditions in the locality where there were the greatest number of cases. She caught flies from two undrained privies, on the fences of two yards, on the walls of two houses, and in the room of a typhoid patient. These flies were placed in eighteen sterilized tubes containing suitable culture media for the growth of the typhoid bacilli, and from five of these tubes the germs were isolated. At the time that the collection was made from one of these privy vaults, no fresh typhoid discharges were being emptied into it, so that the presence of the typhoid bacilli on the legs of the flies found there apparently proves that the germs already in the vault

were alive and multiplying, or that the urine or feces of convalescing or recovered cases of typhoid still contained the typhoid bacilli.

We all know how flies swarm around privy vaults, cesspools, other places where there is human excrement, and they have often been seen to fly directly from such places into kitchens and light upon food which was being prepared for eating. With undisinfected typhoid discharges being deposited in such places it can readily be seen how flies can infect food.

During last summer, in the town of Union Springs, which is supplied with water from an artesian well nine hundred feet deep, there occurred a case of typhoid, the origin of which we were unable to satisfactorily explain. During the next two months there developed three cases in two families on adjoining lots. It so happened that none of the three persons who contracted typhoid sickness the first patient referred to. They were drinking the same water as drunk by over three thousand other people, yet there was only one other case of typhoid in the town at the time, and they all had different milk supplies. The flies in that particular neighborhood were very numerous because of the fact that there is a livery stable on the next block, so that it seems probable that flies must have been the carriers of the infection in these cases.

The Army Board above mentioned makes the following statement regarding the dissemination of typhoid by flies among soldiers in the Spanish-American War:

"Flies were undoubtedly the most active agents in the spread of typhoid fever. Flies alternately visited and fed on the infected fecal matter and the food in the mess tents. More than once happened that when lime was scattered in the fecal matter in pits, flies with their feet covered with lime were seen walking over the food. Typhoid fever was much less frequent among messes who had their tents screened than it was among those who took no such precautions. Typhoid fever gradually died out with the fall of 1898 in the camps at Knoxville and Meade, with the disappearance of the fly, and this occurred at a time of the year when in civil practice typhoid fever is generally on the increase.

"The first pits at Knoxville contained, before the first twenty-four hours had passed after the arrival of the troops, fecal matter infected with the typhoid bacillus. Flies swarmed everywhere. Instead of abating, the disease increased. The soldiers were using the same water used exclusively by the citizens of West Knoxville, and among the latter there was not, at that time, a case of typhoid fever."

Dust.—It is perfectly possible for the typhoid bacillus to dry and become adherent to particles of dust and thus get into the atmosphere. Numerous observers have demonstrated that the typhoid germ can retain its vitality in dry dust for a variable length of time. Uffleman has shown that it may live as long as sixty days in dry soil, and in moist soil it may live and propagate for years. The soil may be polluted with the typhoid germ either by the urine or feces of a typhoid patient. It has been found that the feces of a person developing typhoid may contain the germs in large numbers before any symptoms arise to indicate that he has the disease. In from 20 to 30 per cent. of cases of typhoid fever the urine contains the germs. Gwyn reports ten cases of typhoid bacilluria in which pure cultures of the micro-organisms were found in numbers varying from 10,000,000 to 500,000,000 to the c.c. The urine is sometimes so full of the germs that it becomes cloudy. I have recently had such a case, and I may add that it resulted in death. In some cases the urine may contain the germ for months after the patient is well of the disease. So the typhoid fever patient before he is sick, and after he is well, may scatter the infection.

It is not probable that dust is carried for great distances in the atmosphere except in fierce winds, though dust is certainly one of the means of conveying the infection. Infected dust in rooms where typhoid fever patients are confined may cling to the hands, faces, or clothing of those exposed, or it may get into the secretions of the mouth and nose, and later be swallowed with food or water. When the floor is swept off, or the rugs and carpets dusted, as is frequently done by people who are ignorant of the danger from infected dust in the typhoid sick-room, the germs may fall on food or milk, or even into the family's drinking water, and those who have not been in the room may thus become infected.

Recently there have been several cases in which the typhoid germs were inhaled into the lungs, there producing a true typhoid pneumonia, without any involvement whatever of the intestinal tract. One of these cases occurred at the Johns Hopkins Hospital, and was diagnosed and treated as an ordinary case of broncho-pneumonia. The autopsy showed the characteristic lesions of a broncho-pneumonia, with large numbers of the typhoid bacilli in the lungs, blood and spleen, but there was no lesion of the intestinal tract. There have been many other cases of typhoid fever reported in which there was no involvement of the intestines, though the Eberth bacillus was found in the lungs, blood, spleen,

gall-bladder and meninges. In fact, there is much evidence warrant the belief that the infection of typhoid is not infrequent taken into the lungs, and therefore we should guard against in haling dust that has had the opportunity of becoming infect with the typhoid germ.

Eugene Wasden, of the Marine Hospital Service, asserts h belief that in the majority of cases of typhoid the lungs are t infectionatria, and that colonies of the bacilli first locate at son point in the respiratory tract, generally the lower lobes of t lungs. He says that in practically all cases typhoid sepsis occu early in the disease, and that the lesions in the intestines do n occur until after the germs get into the blood. He reports h last series of (27) cases, in all of which he was able to demo strate the primary pneumonic focus, and in them all he found t lung symptoms characteristic of a broncho-pneumonia or a su acute bronchitis. He thinks that dust is the great disseminat of typhoid fever, and remarks that "it would be better to filt the street-sprinkling water supply and allow the drinking of h drant water."

As to the part that dust played in spreading typhoid fever the concentration camps during the Spanish-American War 1898, I will quote the following from the Army Commissio report:

"The shell roads through the encampment at Jacksonville we ground into the finest dust by the heavy army wagons. T scavenger carts carrying the tubs filled with fecal matter pass along these roads, and their course could often be traced by t bits of feces falling from the tubs. Other vehicles ground the fecal matter and dust together and the winds disseminat these particles here and there. Men inhaled the dust. It w deposited in food in mess tents by the roadside, and men ate t dust. Pollution of the soil by those suffering with typhoid fev was of frequent occurrence. Cases of this disease under t diagnosis of malarial fever were repeatedly treated throughc their sickness by the regimental surgeons. Patients convalesci were also returned to their respective companies. Unc these conditions there must have been abundant opportunity f contamination of the camp site with the specific germs. We a therefore, inclined to the opinion that infected dust was one the factors in the dissemination of typhoid fever."

Contact Infection.—A number of physicians hold to the thec that typhoid fever is contagious in some unknown manner, and

upholding their position they point to the fact that it is a frequent occurrence for those who are nursing typhoid to contract the disease; and that with a water supply of undoubted purity, other persons in the house with a case of typhoid fever contract the disease. With our present knowledge of the habits and life history of the typhoid bacillus, the origin of these can be easily explained.

It has been proven that typhoid bacilli can live and retain their virulence for two or three months on cotton, woolen and linen cloth. Persons exposed to a case of typhoid may carry the germs on their clothing or person for weeks and thus contract the disease and carry it to others. Nurses, in handling the discharges and soiled linen or bedding of a patient sick with typhoid fever, may get the germs on their hands, and unless they are careful about disinfecting them, in handling their own or other people's food may also be the means of conveying the infection. The typhoid bacilli may live for weeks under the finger nails.

Under the heading of dust I necessarily had to discuss some phases of contact infection and I will not dwell further on it, though in supporting the views which some may consider unorthodox, I cannot refrain from quoting the following paragraph from the Army Board's report:

"It is more than likely that men transported infected material on their persons and in their clothing and thus disseminated the disease. We have condemned the method as followed in many of the camps of detailing men from the ranks to act as orderlies in the hospitals. In some of the commands it was customary to detail a hundred or more men from the line every morning. These men went to the hospitals and handled the bed-pans used by the persons sick with typhoid fever, and at night returned to their comrades. The most of these men were wholly ignorant of the nature of the infection or the methods of disinfection. In fact, at one of the division hospitals we saw orderlies go from the hospital and partake of the mid-day meal without even washing their hands. These men handled not only the articles of food which they ate, but passed articles to their neighbors. It seems to us that a more certain method of disseminating an infectious disease could hardly have been invented. Certain tents were badly infected and the majority of their inmates had the disease, while other tents wholly escaped. Blankets and tentage became soiled with the typhoid discharges, and in this way the disease was propagated and carried by the company wherever it went. We there-

fore believe that personal contact was an important factor in the spread of the disease."

Uncooked Vegetables.—Celery, water-cress, lettuce, and other vegetables which are eaten without cooking may become infected with the typhoid germ, either from the soil in which it is grown or from being washed in polluted water. Several epidemics from this source have been reported, notably the one at Northampton, Mass., in an insane asylum in which there occurred a large number of cases of typhoid where the source of infection was seemingly traced to eating celery which had been grown in beds fertilized with "night soil."

Oysters may become infected in their beds, or in polluted fresh water into which they are sometimes placed to undergo the process known as "plumping." A number of typhoid epidemics have occurred which were undoubtedly due to infected oysters. Last December at Portsmouth, England, fourteen of the prominent guests who had attended the mayoralty banquet developed typhoid fever. Upon investigation it was found that the Emsworth oyster beds, from which were taken the oysters served at the banquet, were located where the town's sewage was discharged directly over them; and as this sewage was almost certainly polluted with the typhoid germs, it seems certainly almost probable that the oysters became infected in that way.

Ice.—Freezing does not actually destroy the typhoid bacillus, though it unquestionably inhibits its growth and virulence. However, it has been known to live and retain its virulence in ice for more than a hundred days. Manufactured ice is not likely to become infected, since it is made largely from sterilized water, but the ice from lakes, ponds and streams, which is stored up in winter and kept until spring, is almost as likely to be infected as drinking water from the same sources, though, as I have said, the cold of ice greatly lessens the virulence of the typhoid germs and in four months will destroy them.

The prevention of disease is the highest and noblest art in our profession, and when physicians and the laity realize that typhoid fever is a highly infectious disease and so become imbued with the importance of preventing its spread, then will we hope to make it one of the rare diseases. I fear that the majority of physicians are too negligent in the prophylactic management of typhoid fever. It would be better for the world if physicians sent for in cases of typhoid fever were to prescribe methods for preventing other members of the family from contracting the disease, and let the

patient go without medicine, than to do as is frequently done by physicians who ought to know better, that is, dose the patient with medicines, which in the majority of cases do no good, and make no effort to find the source of the infection, nor use any methods to prevent its spread. That is a very sensible law in North Carolina, which makes it a criminal offence, punishable by fine or imprisonment, for a physician who is treating a case of typhoid fever to fail to instruct the attendants regarding the methods of disinfecting the discharges of the patient. If a physician has not the moral courage to do his duty in preventing disease there should be laws to "hand the wretch to order."

How can we guard against the infection of typhoid fever in sources other than drinking water? I shall take the position that the place to begin is with the patient, because there you have a known focus of infection.

The typhoid fever patient should be isolated, as we do other infectious diseases, in a well-ventilated room, preferably on the sunny side of the house. Fresh air and sunlight are more potent disinfectants than many of those sold on the markets. Window curtains, pictures and other hangings, carpets, rugs and unnecessary furniture, which catch dust and hold the infection, should be removed from the room. His personal and bed linen, upon becoming soiled, should be immersed in an antiseptic solution before being taken from the room, and before use again should be boiled for not less than half an hour. The excreta should be carefully disinfected. Simple immersion in an antiseptic solution is not sufficient to destroy the typhoid germs in feces—it should be kept in contact with the solution for several hours. The bed-pans and urinals should constantly contain a small amount of the antiseptic solution, and the discharges should immediately be placed in another vessel containing at least two parts of the solution to one of the feces. The feces should be thoroughly broken up and mixed with the disinfectant solution, and should so remain for at least four hours before being placed in the water-closet, if the house is connected with a sewer; if not, it may be covered with dry earth at a place where the drainage will not go into the water supply. Under no circumstances should the excreta of a typhoid patient be placed in a privy vault, or exposed in any place where it can be reached by flies, or becoming dry get into the atmosphere as dust. In other words, do not depend entirely upon chemical disinfectants to destroy all the typhoid bacilli in the discharges of any patient suffering with that disease.

Urotropin given internally, in doses from five to ten grains every four hours, will completely sterilize the urine, and since in some cases of typhoid bacilluria the germs may be found in the urine for weeks after convalescence, the urotropin should in those cases be kept up for several weeks after the patient's recovery. Probably the best chemical agent for disinfecting urine after it has been voided is formalin (a 40 per cent. solution of formaldehyde in water). One teaspoonful added to half a pint of urine will completely sterilize it in a few minutes. For disinfecting feces with formalin use two parts of a solution containing one tablespoonful of formalin to one quart of water to one part of feces.

Carbolic acid (3 per cent. solution), preferably with from 3 to 5 per cent. of common salt, or with a small quantity of a mineral acid, next to formalin is probably the best disinfectant for destroying the germs in typhoid excreta, and has the advantage of being cheaper than the formalin.

The cresols, which occur as impurities or by-products in the manufacture of phenol, are more powerful germicides, and less toxic to man, than the carbolic acid, and since they are also cheap are coming into general use. Creolin, which contains 10 per cent cresols held in solution with soap, is a very effective germicide when used in a 5 per cent. solution. Lysol contains 50 per cent of cresols with neutral potash soap, and in a 1 per cent. solution is as powerful as a 5 per cent. solution of carbolic acid. The crude carbolic acid, since it contains as an impurity the cresols is preferred by some, who claim that it is not only cheaper but a more efficient germicide than either the pure carbolic acid or the cresol preparations.

Mercuric chloride is used perhaps more than any other agent for disinfecting, and is one of the most powerful antiseptics that we have, yet in disinfecting feces is it probably almost inert. It forms upon the addition of organic matter the albuminate of mercury, which coats over the substances and temporarily inhibits germ life, but it has very little powers of penetration. With feces it likely forms the sulphide of mercury, which has very slight bactericidal properties, before it has time to have much effect in destroying the bacilli in the feces. The use of mercuric chloride in typhoid fever should be limited to disinfecting the hands and in washing off the floors, walls and furniture.

Nurses after handling the patients' soiled linen, or the bed pans and urinals, should use great care in disinfecting their hands particularly before taking food. Simply washing the hands is

not sufficient; the space under the nails should be carefully cleansed, and the hands after thorough washing in soap and hot water should be bathed in an antiseptic solution, preferably a 1 to 1,000 solution of mercuric chloride. Those who are nursing a typhoid patient, or who are constantly in the room with him, should change their clothing before coming in contact with others.

After the death or recovery of a patient the room should be disinfected as in other infectious diseases.

In guarding against milk infection it is well worth the while for every family to examine carefully into the milk supply. Dairies which supply milk to cities should be regularly inspected by an efficient medical officer. Cows should not be pastured on lowlands upon which the sewage of small towns is drained. Milk vessels should always be washed in boiling water before being used. Milkmen should use great care in cleansing their hands and the udders of cows before milking. In case of an epidemic of typhoid fever, or even with a single case in a family, it is best to boil the milk and protect it from the dust and flies after it is thus sterilized.

The proper disposal of the excreta of the typhoid patient will, in a great measure, prevent infection from dust. However, it should be remembered that the sputum of the typhoid patient may contain the Eberth bacillus, and it should be burned or disinfected as we do in tuberculosis of the lungs.

Flies present a greater problem. Of course, if the excreta is disinfected and placed where the flies cannot reach it, they cannot carry the infection; but every fly should be regarded with suspicion, because our neighbors, even at considerable distances from our homes, may not take any precautions in disinfecting the excreta of their typhoid sick. We should, therefore, screen with great care our windows and doors, particularly in the rooms where food is kept, prepared or served. Something may be done to destroy flies in their breeding places, which is largely in the excreta from horses, though they breed to some extent in human excrement. Cities should adopt ordinances requiring the proprietors of livery stables, and individual owners of horses, to screen the piles of horse manure, or to keep them covered in such a way that flies cannot breed in them. Chloride of lime, which will destroy the larvæ of the house fly, should be kept in stables by the barrelful, and every few days should be sprinkled over the horse manure. These methods of lessening the number of flies are

practical and inexpensive, and should be carried out on farms well as in cities.

Typhoid infection from uncooked vegetables would be v much lessened if the practice of using human excrement, or "ni soil," as a fertilizing agent were not permitted, particularly growing vegetables which are eaten without cooking. Bef eating any raw vegetables they should be thoroughly washed water of known purity, and in boiling water where it will destroy their flavor.

Oysters which are suspected of being infected should never eaten raw. Oyster beds should not be allowed near the openi of city sewers, and oysters in being "plumped" should be pla in water of known purity.

Ice, in its manufacture, should be made only of pure water, a that which is obtained from ponds, lakes and streams should be cut near the outlets of sewers, or at other places where water is likely to be polluted. However, ice is such an infrequ source of infection for typhoid fever that we may almost wh disregard it as a factor in the production of the disease.

Finally, as I have said before, the prevention of typhoid fe should begin by limiting the infection to the patient under tr ment; and when physicians do their full duty in instructing laity regarding the infectiousness of typhoid fever, as well a see that proper methods are carried out to prevent its spread, may almost hope that typhoid fever will cease to be one of endemic diseases.

CHANGED THE MOOD.—Gen. Leonard Wood attended in boyhood a school in Middleborough, Mass., and in Middleborou says the New York "Tribune," they will speak of the direct original mind that the boy had.

"I remember one day in school," said a Middleborough man cently, "Wood was called up in the grammar lesson. The teac said:

"'Leonard, give me a sentence, and we'll see if we can chang to the imperative mood.'

"'The horse draws the cart,' said Leonard.

"'Very good. The horse draws the cart. Now change the s tence to a neat imperative.'

"'Gee-up,' said young Wood."

THE HOME IN ITS RELATION TO THE TUBERCULOSIS PROBLEM.*

By WILLIAM OSLER, M.D.,
Of Baltimore, Md.; Professor of Medicine Johns Hopkins University.

I.

In its most important aspects the problem of tuberculosis is a home problem. In an immense proportion of all cases the scene of the drama is the home; on its stage the acts are played, whether to the happy issue of a recovery, or to the dark ending of a tragedy, so commonplace as to have dulled our appreciation of its magnitude. In more than four hundred homes of this country there are lamentations and woe to-night: husbands for their wives, wives for their husbands, parents for their children, children for their parents. A mere repetition of yesterday's calamities! and if the ears of your hearts are opened you can hear, as I speak, the beating of the wings of the angels of death hastening to the four hundred, appointed for to-morrow. That this appalling sacrifice of life is in large part unnecessary, that it can be diminished, that there is hope even for the poor consumptive—this represents a revulsion of feeling from an attitude of Oriental fatalism which is a triumph of modern medicine. Our French brethren have made the present position of the question possible. Laennec, the father of modern clinical medicine, gave us the pathology of the disease—and much more. While Galen, Frascatorius, Morton and others believed strongly in the contagiousness of phthisis, it remained for Villemin to demonstrate its infectiveness by a series of brilliant experiments which made Koch's work inevitable; while to Verneuil, Chauveau, Nocard, Brouardel and others we owe the initiation of those local and international congresses which have done so much to rend the veil of unfamiliarity, and to educate the public and the profession to a point at which scientific knowledge has become effective. It seems a law that all great truths have to pass through a definite evolution before they reach a stage of practical utility. First the pioneers, seeing as through a glass darkly, groped blindly for the truth, but worked

*A lecture delivered under the auspices of the Phipps Institute, Philadelphia, Dec. 3, 1903.

so effectually that by the seventh decade of the nineteenth century we had a clear pathology of tuberculosis and an accurate symptomatology; while in each generation a man had not been wanting, who, like Sydenham, or George Bodington, appreciated the essentials of treatment, as we recognize them to-day. Then Villemin and Koch demonstrated the truth of the infectivity of the disease and the presence of a specific germ. Watchers on the towers, like the late Austin Flint, a life-long student of the disease, welcomed the announcement as the much wished for fulfilment of a prophecy; but, as Plato shrewdly remarks, we are not all awake when the dawn appears, and many in this audience, like myself, had to see the truth grow to acceptance with the generation in which it was announced. It is a horrible thought, but very true, that we reach a stage in life, some earlier, some later, in which a new truth, a perfectly obvious truth, cannot be accepted; and the work of Villemin and of Koch fared no whit better with the seniles and the pre-seniles of the seventh and eighth decades of the last century than did Harvey's immortal discovery in his day, or for the matter of that, did Lister's great work. And now we are in the third or final stage, in which the truth is becoming an effective weapon in the hands of the profession and of the public. The present crusade against tuberculosis, which is destined to achieve results we little dream of, has three specific objects: First, educational—the instruction of the profession and the instruction of the people; second, preventive—the promotion of measures which will check the progress of the disease in the community; third, curative—the study of methods by which the progress of the disease in individuals may be arrested or healed. The three are of equal importance and the first and the second closely related and interdependent. The educational aspects of the problem are fundamental. Nothing can be done without the intelligent co-operation of the general practitioners and of the community, and it is a wise action on the part of the Phipps Institute to take up actively this part of the work, and to spread a sound knowledge by lecture courses and by publications. It is not too much to say that could we get, on the part of the doctors throughout the country, an early recognition of the cases, with a practical conviction of the necessity of certain urgent and obvious measures, and on the part of the public attention to hygienic laws of the most elementary sort—could we in this way get the truth we know into the stage of practical efficiency, the problem would be in sight of solution.

Of late years there have been done in this country three pieces of work, relating to tuberculosis, of the first rank—that of Trudeau in the Adirondacks, enforcing on our minds the importance of the sanitarium treatment of early cases; that of Biggs and his associates in the New York Board of Health in demonstrating how much can be done by an efficient organization; and, thirdly, the work of Lawrence F. Flick, the Director of the Phipps Institute, in demonstrating by a long and laborious research the dangers of the house in the propagation of the disease. In casting about for a subject it seemed to me most appropriate to discuss those aspects of the problem which concern the home in its relations to the disease, since after all the battlefield of tuberculosis is not in the hospitals or in the sanitaria, but in the homes, where practically the disease is born and bred.

II.

The germ of tuberculosis is ubiquitous; few reach maturity without infection; none reach old age without a focus somewhere. This is no new opinion. Gideon Harvey, in his *Morbus Anglicus* (1672, 2d Ed.), says: "It's a great chance, we find, to arrive to one's grave in this English climate, without a smack of a consumption, Death's direct door to most hard students, divines, physicians, philosophers, deep lovers, zealots in religion," which is the English equivalent of the German popular saying, "Jedermann hat am Ende ein bischen Tuberculose." This may seem an exaggerated statement, but the records of Naegeli demonstrate its truth. After all, it is only from the post-morten table that we can get a true statement of the frequency of tuberculosis in the community. It has long been known that a very considerable percentage of persons not dying from consumption have the lesions of tuberculosis. The records have ranged in different series from 7.5 per cent. (Osler) to 38.8 per cent. (Harris). But these studies were not made directly with a view of determining the presence of tuberculosis. They were the ordinary every-day observations of the post-mortem room. The only series which we have dealing with this question in a satisfactory way is the study of 500 post-mortems in Professor Ribbert's Institute in Zurich, by Naegeli. It is to be borne in mind that in his work special examination was made of every organ of the body, sections were made of all parts with the greatest care, and the individual lymph glands particularly inspected. Tuberculous lesions were found in 97 per cent. of the bodies of adults.* He gives a very

*Virchow's Archiv, 1900, Bd. CLX, page 426.

interesting curve showing the incidence at different ages. Up to the fifteenth year there was only 50 per cent., then there was a sudden rise in the eighteenth year to 96 per cent., with a slow rise, so that by the fortieth year a tuberculous focus was found in everybody. This careful research demonstrates the extraordinary susceptibility in man to tuberculous infection, and an equally extraordinary degree of resistance. In the tuberculin experiments of Franz on healthy Austrian soldiers a reaction was shown in over 60 per cent., so that we must accept the conclusion that tuberculous infection, latent tuberculosis, is much more extensive than is the manifest disease.

One interesting point is that we are never left long in peaceful possession of a satisfactory belief about the modes of infection in tuberculosis. No sooner had the pool got quiet and we had settled into a comfortable conviction of the unity of human and bovine tuberculosis, than Koch stepped in and troubled the waters with his views on their dual nature; and now, just as the commotion was subsiding, von Behring stirs the waters by referring all tuberculosis to the milk-jug. But none of these investigations has diminished the importance of the home as the chief source of infection, the place in which the conditions favoring contamination are most common, particularly among the poor. Nor do I think that we can give up the view of aerial convection and of primary inhalation infection in a large proportion of the cases. Figures are, of course, tricky playthings, but it does seem that the overwhelming evidence of the prevalence of bronchial and pulmonary tuberculosis in children is in favor of the older views. After all how rare is intestinal tuberculosis as a primary lesion, and if, as von Behring supposes, there is a special vulnerability of the bowel in childhood, we should expect a much larger number of cases. It is quite possible, as he has shown, and as Ravenel has demonstrated, that the bronchial and cervical lymph glands may be the first attacked in an animal infected through the intestines; yet the incidence in childhood of respiratory disease is so large, and the incidence of intestinal lesions is so small, that it counts strongly against von Behring's new views. In fact, primary intestinal tuberculosis is extraordinarily rare. Koch states that there have only been ten cases in ten years at the Charité Hospital, Berlin, and of 3,104 instances of tuberculosis in children there were, according to Biedert, only 16 cases, while in adults primary intestinal tuberculosis occurred in but one instance in 1,000 autopsies at the Munich Pathological Institute. In this country the studies

of Bovaird in New York, and of Hand in Philadelphia, speak strongly in favor of air-borne infection in the large majority of cases in children. There is a special liability of the milk to become contaminated by the dust in uncleanly streets and in dirty houses, and upon this mode of infection von Behring lays great stress, and in infancy, either in this way or from the milk of tuberculous cows, he thinks the majority of persons become infected. Apparently he does not adopt Baumgarten's view of the latency of the germ itself, but of the latency of small foci of disease acquired in childhood, which only develop into active tuberculosis under favorable circumstances. It may be well to quote his own words in this connection, as his views are of importance: "I am well acquainted with the statistical arguments based on the higher returns of infection and mortality from consumption among attendants on the sick residents in houses occupied by people known to be phthisical, and inmates of prisons, which are intended to demonstrate the origin of pulmonary phthisis from the inhalation of particles of dust, or moisture containing tubercle bacilli. But in view of the extensive dissemination of tuberculosis above described among the human race, there is ample justification for the objection that in cases of this kind, where persons succumb to pulmonary phthisis, tuberculous foci pre-exist in their lungs, and that these pulmonary lesions already present developed into active consumption, owing to the adoption by those persons of a mode of life favoring tuberculosis."—"British Medical Journal," Translation, Oct. 17, 1903.

We need a systematic inspection, according to Naegeli's method, of the bodies of children dead of acute diseases, so as to get, if possible, the true incidence of infection in them. Councilman and others have shown how frequently tuberculosis is present in the bodies of young children dead of diphtheria, but the statistics at our disposal certainly do not bear out this view of von Behring, which would lead us to suppose that infection was largely a matter of childhood. Naegeli's figures on this point are interesting, though he only had 88 autopsies on children. Still his results are of value, as the inspections were made with such very special care. Of these 88 children there were only 15 with tuberculous lesions. In 10 of these the tuberculosis ran a fatal course; in 4 there were advanced lesions which did not cause death, and in only one was there a definitely healed lesion.

Sown broadcast as they are in our modern life, it is evident that few people reach maturity without harboring the seeds of tuber-

culosis. That we do not all die of the disease is owing to the resistance of the tissues, in other words, to an unfavorable, *i. e.*, the rocky soil on which the seeds have fallen. The parable of the sower sets forth in an admirable way the story of the disease. Since I used it, in 1892, the illustration has become hackneyed, but in a semi-popular lecture I may be permitted to employ it again. The seeds that fall by the wayside are the bacilli that reach our great highways, the air passages and intestines, in which they are picked up by the phagocytes, representing the birds of the air, or they are trodden under foot by the swarms of contending organisms. The seed that falls on stony places is that which reaches the lymph-nodes of the bronchi and mesentery, and though it springs up and flourishes for a while, there is no depth of earth, and, lacking moisture, it withers away into cretaceous healing. And that which falls among thorns represents the bacilli which effect a lodgment in the lungs, the kidneys or elsewhere, where they thrive and grow and produce extensive changes, but the thorns—the equivalent of the cares of this world and the deceitfulness of riches, in the parable—grow up also, and in the form of delimiting inflammatory processes and of contracting fibrosis, choke the seed, and recovery ultimately takes place. But falling on good ground, the seed springs up, increases and brings forth fruit some thirty, some sixty and some a hundredfold, which may be taken to represent the cases of chronic, subacute and acute tuberculosis. We are beginning to appreciate that the care of the soil is quite as important as the care of the seed. We cannot repeat Trudeau's remarkable environment experiment in our cities, but we learn a practical lesson of the influence of fresh air, open spaces and sunlight upon infected individuals. Much has already been done in this direction, and the reduction of the mortality from tuberculosis which has been going on for the past twenty-five years has been in great part due to improved sanitation. We have only made a beginning, but to know the enemy in this case, to know that his strength lies in the homes of the poor, is more than half the battle.

Let us look at the conditions confronting us in one of the large eastern cities. Like Philadelphia, Baltimore is fortunate in the absence of big tenement houses, but, like it, too, it has the disadvantage of a large number of very narrow streets and alleys. There is no drainage system, the sewerage is collected into cesspools, while the surface water and the water from the kitchens runs off on surface drains. There is a very large foreign popula-

a large number of colored people. While tuberculosis common disease, I do not think the mortality in Balti- pecially high. In the report of the Board of Health for 1901, there were 1,274 deaths from the disease in a total of 10,479, about 12 per cent.

·ears ago two ladies, interested in the disease, gave me money to use in connection with our work at the Johns Hospital. We do not take many cases of tuberculosis wards. Last year there were only 53. They come ›r the purpose of diagnosis, and we often admit patients side the city on purpose to teach them for a period of a en days, just how to regulate their lives. It seemed best do something for our consumptive out-patients, of whom ın average of about 200 new cases in the year. It seemed ıt a good and useful work could be done by the personal ın intelligent woman to the houses of these patients, that t show them exactly how to carry out the directions of cian and give them instructions as to the care of the spu- preparation of food, and when necessary to report to the Organization as to the need of special diet, or to the ›oard when the surroundings were specially unsanitary. ːtion with this an inspection has been made of the condi- ːr which these people live. Of the 726 cases, 545 were ıd 181 blacks. Among the whites were 53 Russian Jews. ːre 492 males, 234 females. The analysis of the reports Dutcher, Miss Blauvelt and Miss Rosencrantz during the years is briefly as follows:

	Russian.	*Colored.*	*White.*
	Per ct.	*Per ct.*	*Per ct.*
ınitary location	62	53	16
ːient light and ventilation	71	65	39
owding	61	41	32
al and household uncleanliness	70	56	30

hite population in a large majority of the cases was dis- irregularly throughout the city, but a large proportion ›od locations, many even on new streets in the suburbs. percentage, about 20, live in a bad neighborhood, where s are close together, and hemmed in in narrow alleys and This region lies chiefly to the south and west of the hos- ard the harbor. In about a third of these people the

personal and household cleanliness is fairly good. The colore people make up about a fourth of the cases. They live in muc more unfavorable localities, chiefly in narrow, thickly populate and dirty alleys in small two-story houses, usually old, and th windows often limited to the front—houses in which proper ligh ing and ventilation are impossible. One important feature in th colored population is the desire always to occupy their own house so that there is comparatively little overcrowding. The Russia Jews form about one-fourteenth of the total number of patient They live in a neighborhood that was at one time inhabited by th wealthier classes and the houses have now been converted in tenements. The streets are in many cases wide and clean an sunny. The percentage of overcrowding in the rooms is hig Very often a family of seven or eight is found in two rooms. Th contrast in the matter of personal and household cleanliness b tween the Russians and the other whites is most striking. It exceptional to find the former in a condition, either in person house, that could be termed in any way cleanly. A very serio thing is the frequency with which the patients move from o place to another. The 726 patients had during their illness c cupied 935 houses. Last year the percentage of removals w still higher. The 183 patients had occupied 379 houses. A other important point brought out was the fact that fully 66 p cent. of the patients visited did not sleep alone.

Amid such sanitary surroundings the patient can scarcely avo contaminating the house in which he lives, while, perhaps mo important still, the environment, combined with insufficient foo etc., lowers the resistance of the other members of the family an renders them more liable to active disease.

How are we to combat these conditions? *First,* by an educ tional health campaign in the homes. The young women wh have been engaged in this work in Baltimore have frequently re ported to me the readiness with which their suggestions have be accepted, particularly in regard to the care of the sputum. To successful such a campaign must be carried out by the Board Health, and a staff of trained visitors, women preferably, shou do the work. To carry this out effectually there should be, *se ondly,* in all cities a compulsory notification of cases. The pl has worked most successfully in New York, and it should everywhere followed. There are no difficulties which cannot readily surmounted, and there need be no hardships. *Thirdly,* most cities the powers of the health boards should be greatly e

larged, so as to deal efficiently with the question of proper disinfection of the houses occupied by tuberculous patients. *Fourthly,* the question of the housing of the poor needs attention, particularly in the matter of proper control of tenements, and the regulation, by law, of the number of persons in each house. *Fifthly,* by placing upon the landlord the responsibility of providing, under the control of the Board of Health, a clean, wholesome house for a new tenant. *Sixthly,* the wholesale condemnation of unsanitary streets and blocks, and the rebuilding by the municipality, as has been done in Glasgow and elsewhere. We cannot make people cleanly or virtuous by act of the legislature; at the same time we cannot leave important sanitary details in the hands of irresponsible persons whose view of life is limited to returns and rentals. The extraordinary reduction in the mortality from consumption in the large cities is due directly to an improvement in environment. That much more remains to be done in the way of betterment the facts I have presented fully show.

III.

And then we have to face the all-important fact that at present an immense majority of all tuberculous patients have to be treated at home. Probably not 2 per cent. of the cases can take advantage of sanitarium or climatic treatment. What has the new knowledge to say to the 98 per cent. which is debarred from the enjoyment of these two great *adjutores vitæ?* Very much! Read aright, a message of hope to many. Just as we have learned that climate in itself is not the prime essential, but a method of life in any clime, so we have found that even under the most unfavorable surroundings many cases recover in town and country, if rigid system and routine are enforced. But "Hope, that comes to all," as the poet sings, comes not to the large proportion of the unhappy victims in our overgrown and crowded cities. What but feelings of despair can fill the mind in the contemplation of facts such as I have laid before you in the analysis of our inspection in Baltimore? So numerous are the patients that private beneficence shrinks at a task which the city and State authorities have not yet mustered courage to attack, except in one or two places. Hospital care for advanced cases, sanitarium treatment for incipient cases, can only be provided by an enormous expenditure, but we must not be discouraged, and the good work begun in Massachusetts, New York and in this State will grow and prosper. After all, the campaign in which we are engaged is one of educa-

tion; only let us not forget that teaching has not all been on the side of the profession. We have all been at school during the past quarter of a century, and at school we must remain, at once teachers and pupils, if we are to make the knowledge we possess effective. We are not living in Utopia, and in the matter of sanitation the man on the street is a blundering, helpless creature whose lessons are put bodily into him at a heavy cost of life and health. You know this story only too well in Philadelphia. To provide accommodation for all consumptives is impossible, but it is not unreasonable to look forward to the day when every large city will have a sanitarium for the treatment of the early cases, situated not far from its outskirts, with all the equipment for open-air treatment. Let there be some place at least where a poor working man or working woman may have a chance for life. Now, as we doctors know only too well, hundreds are sacrificed in whom the disease could have been arrested. The hospital care of the very sick should be provided for in special wards of these city hospitals. To give the best of care to these unhappy victims is a true charity to them; to place them where they cease to be a danger to the general health is a true charity to others.

In the warfare against tuberculosis the man behind the gun is the general practitioner. The battle cannot be won unless he takes an active, aggressive, accurate part. That he is not always alert must be attributed in part to the carelessness which a routine life readily engenders, and partly to a failure to grasp the situation in individual cases. The two points to be impressed upon him are, first, *that early recognition of the disease can only come from better methods of practice and greater attention to the art of diagnosis.* The insidiousness of the onset, the protean modes of advance, and the masked features of even serious cases should never be forgotten. As Garth so well puts it in his Dispensary (1699):

> "Whilst meagre *Phthisis* gives a silent blow;
> Her *stroaks* are sure; but her advances slow.
> No loud alarms, nor fierce assaults are shown,
> She starves the *fortress* first, then takes the *town.*"

Too often precious time is wasted and the golden opportunity is lost by the failure of the physician to make a thorough examination of the chest. I am every day impressed with the necessity of more rigid, routine examination, even of the "ordinary case." In

illustration of the carelessness which is so readily acquiesced i let me mention a patient who was brought to me only a fe weeks ago, supposed to have a protracted fever after typhoi Her father a physician, her husband a physician, and it is scarce credible that neither of them had the faintest idea that the po soul had advanced consumption, though it had reached a stage which there was shrinkage of one side of the chest, and the dia nosis could almost be made by inspection alone. The carelessne is a sort of mental inadvertence, to which even the best of us times seem liable. A very distinguished and careful physici brought his daughter to me a few years ago to have her bloc examined, as he felt sure she had a chronic malaria. She had litt or no cough, but an afternoon rise of temperature, and it turn out to be the usual story—quite pronounced local disease at h left apex. There had not been a suspicion on the part of h father or of the family.

On the other hand, we must be careful not to diagnose tube culosis too readily. The physicians of our sanitaria have a goc many tales to tell in this matter.

The second point is the *necessity for a more masterf management of the early cases.* Here comes in that person equation so important in practice, and which has such a vital bea ing in the prognosis of the disease. The dead hand of the Arabi still presses sore upon our practice, and precious weeks are t often lost in trusting to a polypharmacy which in some instanc would make the heart of Avicenna or Averroes to rejoice. It m seem hard to say so, but my firm conviction is that more tuberc lous patients are injured than helped by drugs. We have not y come to the belief—to the practical belief, at any rate—that t disease is not to be *treated* by them. After so much has be written and spoken, one would suppose that the essential featur of the treatment of the disease were generally recognized, b the practical experience of any man who sees a great deal of tube culosis is directly to the contrary. It is not so much that the dru do harm *per se,* but that weeks of priceless value are lost in tr ing to check a cough and quiet a fever in a patient who is allow to continue his work and is up and about. I cannot agree with recent writer who says that the tendency at present is rather make too little than too much of medicinal treatment. Perha in advanced cases we are more sparing, but in early stages *I kno* that we are still leaning on the Egyptian reed in which our fathe trusted and trusted in vain. Year by year I see only too many i

stances in which the mental attitude of the physician toward the disease clearly indicates that the idea of an efficient home treatment by fresh air had never been entertained. What I would like to plead for mostly is this home treatment of early cases by modern methods. I am not addressing myself now to city physicians. But I would appeal to the practitioners in the country and in the smaller towns and in the suburbs, where the conditions are so much more favorable. I have been much interested for several years past in a group of cases scattered all over the country, usually in the farmer or mechanic class, in which I have supervised with the physician a home treatment, often with striking success. The remarkable case which I reported in 1900 gave me great encouragement, as the complete arrest of the disease was accomplished under the most primitive surroundings by the persistence and devotion of the patient herself, who richly deserves the good health she enjoys to-day. There have been disappointments; all cases are not suitable, all cases are not curable, and it is not easy to say which ones are likely to do well. The most favorable-looking patient with a small patch at one apex may have a progressive disease and die in the best of surroundings, while a case with high fever, sweats and an extensive lesion may improve rapidly. On November 24th, a fine, stalwart fellow came to see me, in whom I did not recognize the *poitrinaire,* of September 28th, carrying his diagnosis in his face. The sunshine and open air of a Maryland village had been enough; enough, at any rate, to put him on the high road.

Let me mention in a few words the essentials in this home treatment of consumption in the small towns, country places and the suburbs of our large cities. *First,* the confidence of the patient, since confidence breeds hope; *secondly,* a masterful management on the part of the doctor; *thirdly,* persistence—***benefit is usually a matter of months, complete arrest a matter of years, absolute cure a matter of many years; fourthly,*** sunshine by day, fresh air night and day; *fifthly,* rest while there is fever; ***sixthly,*** breadstuffs and milk, meat and eggs.

Let us not forget that it was a country practitioner, George Bodington, of the little town of Sutton Coldfields, in Warwickshire, who, in 1840, revived the open-air treatment of tuberculosis. "To live in and breathe freely the open air, without being deterred by the wind or weather, is one important and essential remedy in arresting its progress—one about which there appears to have generally prevailed a groundless alarm lest the consumptive should

take cold." And he gives a number of cases showing the good effects of the open-air treatment. He seems to have carried it out on the plan which was so strongly advocated by Sydenham, which was a combination of open air and riding or carriage exercise. There are few things more striking in the writings of Sydenham than the insistence with which he states that consumption is curable. It is worth quoting a paragraph which I take from Locke's *Anecdota sydenhamiana,* as it is put in a more striking way than in his general work: "I am sure that if any physician had a remedy for the cure of a phthisis of equal force with this of riding he might easily get what wealth he pleased. In a word, I have put very many upon this exercise in order to the cure of consumptions, and I can truly say I have missed the cure of very few; in so much that I think how fatal soever this disease be above all others, and how common soever (for almost two-thirds that die of chronical diseases die of a phthisis), yet it is this way more certainly cured than most diseases of less moment: Provided always that this traveling be long persisted in according to the age of the patient, and length of the disease. . . . Women or very weak men that cannot ride on horseback may ride in a coach and yet attain the same end, as I have seen by often experience." In reality, this practice of Sydenham never died out, but it was in practice in New England in the early days and throughout the eighteenth century. The late Henry I. Bowditch, who did so much to further the study of tuberculosis in this country, states that he followed it in his own case.

Let me conclude with a quotation from De Quincy, which puts in graphic language the question which so many generations have asked and asked in vain, but which we have been permitted to answer in part at any rate, and to answer in hope: "If you walk through a forest at certain seasons, you will see what is called a *blaze* of white paint upon certain *élite* of the trees marked out by the forester as ripe for the ax. Such a blaze, if the shadowy world could reveal its futurities, would be seen everywhere distributing its secret badges of cognizance among our youthful men and women. Of those that, in the expression of Pericles, constitute the vernal section of our population, what a multitudinous crowd would be seen to wear upon their foreheads the same sad, ghastly blaze, or some equivalent symbol of dedication to an early grave. How appalling in its amount is this annual slaughter among those that should by birthright be specially the children of hope, and levied impartially from every rank of society! Is the

income-tax or the poor-rate, faithful as each is to its regulating time-tables, paid by *any* class with as much punctuality as this premature *florilegium*, this gathering and rendering up of blighted blossoms by *all* classes?" Then comes the startling question—that pierces the breaking hearts of so many thousand afflicted relatives: "Is there no remedy? Is there no palliation of the evil?" It is one of the greatest triumphs of scientific medicine to be able to reply, Yes, the evil may be palliated and is rapidly being lessened, and for many at least, a remedy has been found.—"Medical News," December 12, 1903.

NAUGHTINESS IN CHILDREN.

From "London Mail":

Dr. Still's theory that evildoing in children is not "naughtiness" but "moral imbecility" has presented an absolutely new problem to the mothers of Great Britain.

It must not, however, be supposed that every phase of infantile peccadillo must be labeled as due to "morbid moral defects." The whose question is purely one of degree. Broadly speaking, the ordinary so-called naughty child is not for the moment, at any rate, worthy of high-class medical consideration.

On the other hand, the abnormally naughty child is by a consensus of scientific opinion to be considered as "morally deficient." Doctors, of course, differ on this point as on all others, but a medical man who is well qualified to speak on the subject—thousands of children coming before him in the course of a year—was distinctly pessimistic about the abnormally naughty child.

In his division children fell into two groups—the normally naughty and the abnormally naughty. Luckily, the abnormally naughty form a very small minority.

He first cleared the ground by saying that children are not born with moral tendencies. The child of three years of age is simply a victim of emotions. It has no morals, but as time goes on accumulated accidents give it experiences which lead it to choose between wrong and right, even upon the lowest possible ground—that right pays and wrong does not.

During the growth of some children, however, it is seen that they are not influenced by considerations of this kind. It may be shown in the most subtle way, or it may be perfectly plain to every one. The fact remains that they are not induced to do

right by punishment. The difference in some cases is so slight in childhood that the doctor was certain that a large number never showed this taint sufficiently to call for any special comment, but when they grew up and restraints were removed they developed into criminals.

One of the great difficulties in dealing with these children was the absence of these special signs, and in view of this the doctor acquiesced in the opinion of Dr. Still that all that could be done was to watch carefully and adopt a system of segregation.

LACK OF SELF-CONTROL.

The lady superintendent of a home for girls stated that such children were to be found in all classes of the community. She noted the case of a little girl who tore up her clothes whenever she could. Her parents were wealthy, and isolated the child from the rest of the family, employing a special governess and nurse for her.

The girls of this kind she had to deal with were generally very strong physically, and quite up to the average mentally. In some cases, in fact, they were of exceptional mental strength.

With the abnormally naughty child punishment only influenced it for a time. The hindrance to its committing the same fault only lasted just so long as the impression of the punishment remained. It was not capable of receiving any cumulative impressions through punishment.

All these faults arose from a lack of self-control. In the abnormally naughty child you could not teach it self-control. In dealing with such children, added the lady superintendent, you could only dominate them by moral and mental strength. She gave an instance of a small but exceptionally strong girl, who, armed with a poker and growling like an animal, held all the teachers of the institution at bay. She had simply to soothe the girl into a state of calm.

Never once did she attempt to get hold of the poker. It would have been fatal to have done so. At last the girl listened to common sense and gave it up. Then she induced her to have a cold bath and to lie down. The girl slept for two hours.

The superintendent dealt with the absolutely inhuman aspect of such children. They seemed a reversion to some early and more animal type. Their faults were in most cases senseless; if they thieved, she said, it was in a "magpie" way.

They all had the vanity of the criminal, and had a tendency to "show off." If they were kept apart from the other girls they

felt it bitterly, and it was, to the usual temporary extent, a punishment. Besides, it was better that they should be removed from contact with other pupils.

She was hopeless as to the education of children of this type. When such girls left her she had to take the utmost precautions with regard to their employers. They were emphatically dangerous.

IS EDUCATION A DANGER?

A view which has been expressed by a competent authority about the education of these "moral deficients," is that it is simply and solely a means of making them more formidable criminals.

The London School Board has recognized the necessity of the course laid down by Dr. Still as the only means of dealing with the cases, and careful steps are being taken. Some homes are being organized by the board for certain groups of mentally defective children who require custodial treatment. Among these some of the "moral imbeciles" will be included.

At the Sanitary Institute it was agreed at the conclusion of Dr. Still's paper that it would be a good thing to have a Royal Commission to consider what should be done with the nation's naughty children. In the minds of some of the promoters of this step is the idea that means should be devised to separate such children, when of an age to be out of the control of any scholastic authority, from the rest of the world. Such a course is held to be necessary if the growing evil is to be checked.

MAGISTRATES AND CHILDREN.

Dr. Beach's declaration that magistrates, when dealing with "naughty" children, show themselves to be the most ignorant section of the community in this respect, has given rise to much scandalized comment.

A well-known metropolitan stipendiary, however, generously smiled at the unkind imputation. "We do not, as a rule," he said, "dabble in nursery questions. We sit on the bench to administer the law, and the law holds that no person up to the age of seven can be held guilty of any offense."

On the other hand, the London "Evening News" is deeply concerned as to the possibilities opened up by the exposure of the abnormally naughty child, and recently gave some cases which may shortly be expected to engage the attention of the majesty of the law. Here are some examples:

At the Old Bailey, Alice Smith, three, was charged with being a moral imbecile. Police Constable 6796A stated that he found the prisoner lying on her back on the Embankment screaming, and he warned her that if she did not get up and accompany her nurse he should charge her with causing a crowd to assemble.

The jury having found the prisoner guilty, without leaving the box, the judge ordered her to be detained during His Majesty's pleasure.

At Bow Street, Thomas Tucker, two, was charged with being found in possession of an impaired moral potentiality. The prisoner, it seems, has been in the habit of stealing sugar from the tea-table, a habit which no amount of correction would cure.

The magistrate said that it was very sad, but he had no option in the matter. Prisoner would be sent to a reformatory for twelve years.

THE CYNIC'S REVISED WISDOM.

Look before you sleep.
Many are called but few get up.
It's a strong stomach that has no turning.
Saint heart ne'er won fair lady.
A church fair exchange is robbery.
Fools rush in and win—where angels fear to tread.
Consistency, thou art a mule.
Economy is the thief of time.
A bird on a bonnet is worth ten on a plate.
What is home without another.
A lie in time saves nine.
Matri-money is the root of all evil.
A word to the wise is resented.
Where there's a will there's a lawsuit.
He laughs best whose laugh lasts.
Misery loves company, but company does not reciprocate.
One touch of nature makes the whole world squirm.
Some are born widows, some achieve widowhood, while others have widows thrust upon them.—From "The Cynic's Calendar of Revised Wisdom for 1904."

THEATER FIRES.

The recent awful tragedy in the Iroquois Theater, Chicago, is of a nature to arouse a feeling of distrust in the mind of every thinking man or woman as to modern fireproofing methods. The question is very pertinently suggested as to whether it is possible to so construct, equip and manage a theater that such an occurrence as has just horrified the world would be impossible.

Before answering this latter question some account must be taken of theater fires in the past and of the conditions under which they have originated and spread. The Iroquois Theater disaster offers the first example of a conflagration in a so-called fireproof structure of its class, for it must be remembered that fireproofing as a science cannot be said to be over thirty-five years old. But in this last fire the loss to life and limb was greater than in any preceding disaster of its kind in this country, over a thousand people being killed, maimed and injured, while the actual deaths, at this writing, are said to run up over six hundred. Only in two instances has this death list been exceeded, namely, in the Ring Theater, in Vienna, in 1881, when about nine hundred lives were lost, and the Lehmann Theater, St. Petersburg, in 1836, when the loss was about equal to that in the Iroquois Theater. As a matter of fact, the construction of a theater bears very little relation to the loss of life which results in a conflagration. The danger comes partly from the fire spreading rapidly, more to liability of suffocation from smoke and gases, but most of all to the unreasoning, blind panic which is so apt to seize a crowd when threatened with danger. In nearly every theater fire, after the spectators have either escaped with their lives or been trampled or suffocated to death, the firemen are able to enter the building with relative impunity and proceed systematically to extinguish the flames. Consequently while no theater ought ever to be constructed which is not in every detail of what we choose to term fireproof construction, the real danger is from other sources, and, as one of our daily papers puts it very properly, our theaters must be not merely fireproof but also panic-proof. In the Ring Theater disaster all of the loss of life occurred during a period of about fifteen minutes. In the Iroquois Theater inside of thirty minutes after the fire originated the flames had been extinguished.

As to the causes of theater fires, these are seldom difficult to

ascertain. Although accounts do not fully agree it seems pretty certain that the Iroquois fire started by a border or hanging drapery coming in contact with an electric arc of some sort. In the Ring Theater disaster the fire was caused by the explosion of a lamp which was dropped on the stage. The burning of the Brooklyn Theater, in 1876, when 293 persons were killed, was caused by a border catching fire from border-lights. In nearly every recorded instance of theater fires when the cause is traced back far enough it is found to be personal, human negligence or carelessness, which could very easily have been prevented, and the spread has almost invariably been due to the fact that those who should have stood between the public and danger lost their heads completely. Eternal vigilance on the part of every one is the only price of safety. The installation of the Iroquois Theater stage was the best that could be devised. It is very easy to look back now and see how disaster might have been averted, but with the amazing complexity of management of the modern stage it can easily be understood how the most careful management and most adequate provision will not always be sufficient to guard against the carelessness of indifferent stage-hands.

There are a number of points that ought to be considered in the construction of every theater, and although many of them are called for by building laws, such laws are unfortunately often more honored in the breach than in the observance. A great deal of emphasis is usually accorded to the necessity for a fire-proof curtain. Its value can easily be overestimated. Had the curtain in the Iroquois Theater not stuck when half way down, in a few seconds the whole stage would have been a mass of flame, and probably not one of the five or six hundred stage-hands, chorus girls, and actors would have escaped alive, while it is very doubtful if after the alarm had once been given the dropping of the asbestos curtain would have averted the horrible panic among the spectators.. The asbestos curtain ought to be in every theater, and it ought to be worked up and down during each performance, and it should run in iron grooves, so that when down it will entirely close the opening. It should, moreover, be suspended in such a manner that the supports cannot be burned away, and should be hung so that it will descend of its own weight. To a small theatrical company the danger from closing this curtain during a fire on the stage is not excessive, but with such a large company as played in "Mr. Bluebeard," the fire curtain when down might easily be a source of danger rather than safety.

Every theater should be thoroughly equipped throughout the entire stage and the rigging-loft, the dressing-rooms, storerooms, airchambers and scenerooms with automatic sprinklers supplied from a gravity tank. Gravity sprinklers are by no means infallible; they go off when not wanted, and on the whole they may damage more property than they save, but if they are kept in proper working order they will go a long way toward ensuring the prompt extinguishment of an incipient flame, and that means the saving of life, even though the property be ruined with water. Furthermore, every curtain opening should be equipped with a water curtain. This device probably in six cases out of ten will fail to work by the holes in the pipes or the orifices of the fan-tail jet becoming stopped with dirt or rust, but the good it might do in the other four times would make it worth all it cost.

The stage-rigging and scenery should, in every theater, be treated so as to be non-combustible. Taking the average value of human life at five thousand dollars, the Iroquois disaster represents a money liability of three million dollars, which is enough to fireproof all the scenery in the country and leave something over for repairs. The theatrical artists may not like fireproof scenery, neither do they like sprinkler-pipes, but it seems utter folly to carefully fireproof the entire structure of a building, and then fill the upper portion of the stage with thirty to fifty tons of highly inflammable fabrics so hung that fire will communicate from one fold to the other like a flash, and inside of twenty seconds after the beginning of a flame the whole mass will be blazing. One has to witness a fire on a stage in order to appreciate the terrible rapidity with which flames will spread through scenery. The fire darts along the cloths and the burning fabrics fall off in great blazing shreds, which mean sure death to anyone upon whom they fall. And yet all this can be absolutely guarded against by simply impregnating the scenery in one of the many solutions which are made for the purposes of fireproofing. In some cities this is required by law, but so far as is known at present in no city is this law enforced.

It goes without saying that wood should be carefully left out of all stage construction. It need not necessarily be omitted from the scenery itself. It is a fact that wood which is treated with one of the fireproofing compounds, while it will char will not blaze nor spread a fire, and such fireproofing should be insisted upon. Then there should be on each side of the stage at the front and at the back a line of not less than three-inch standpipe, with hose

connections and hose, already on a reel, at the front and back on each of the fly galleries, and during the perfofmance there should be some one man on each side at each lever, whose sole business it is to simply watch for fire and be prepared to put it out. And lest this man, who, in a sense, would hold the lives of so many in his hands, should lose his head and fail at the critical moment, seeking safety for himself in flight, there should be a special fire exit readily at hand for his special benefit. This is done in some of the better theaters. It ought to be the rule in every one.

Varnish ought never to be used in any form about a theater. We have seen a flame start on a face of varnished sheathing and run like a flash over the whole face of the wall, and the varnish in burning throws out an enormous quantity of highly suffocating fumes. There are other compounds which would produce a better finish and which are not so highly inflammable.

The building laws in many of our large cities call for a skylight to be placed in the roof over the stage, this skylight to have an area equal to one-tenth of the stage area, and to be automatically movable, so that in case of fire it can be thrown wide open, allowing free escape for smoke and flames. This is another wise provision, but in practice it is rendered of little value for the reason that the skylights are seldom opened, and under emergencies they are very apt to stick and refuse to move.

But fireproofing the stage and scenery will not guard against panic. The only safety in this respect is to so plan the theater that the public will feel they have every facility for rapid, untrammeled exit. There is not a city in this country in which the laws require that a theater shall be isolated on all sides, but such ought to be absolutely the rule. It is not possible when the building is so hemmed in, as was the Iroquois Theater, to so construct the exits in size and arrangement as to be really safe in time of a sudden panic. Boston is the only city that attempts to guard against this by insisting that there shall be in front of each division of the house a lobby large enough to contain, standing, all the people who would occupy the corresponding division of the house. This is a most excellent provision which is entirely lacking in the Chicago laws. Had there been such lobbies properly placed in front of the Iroquois the death list would undoubtedly have been relatively slight. In estimating the size of these lobbies it has been the custom to assume one and a half square feet as the area to be allotted to each person. This is too small. It ought to be counted at two square feet per person at least.

It is to be hoped that the time will come when our law-makers will appreciate the desirability of absolutely prohibiting spectators from standing in any portion of any of the aisles or passageways of the theater. Such a provision, as far as it relates to aisles, is embodied under the Boston and the New York laws, but it is seldom enforced, and every theater that is built makes admitted provision for "standees." When every seat is filled not another person ought to be allowed in the house. Three of the oldest theaters in the country: the Boston, the Academy of Music in New York, and the Academy of Music in Philadelphia, are arranged so as to absolutely exclude standees unless they remain in the outer corridor and peer through the glass doors. It is also in Europe the general custom to so arrange the theaters, but our American managers appreciate so keenly the money value of stand-up tickets that in all our recent theaters most liberal provision is made for such frequenters.

When it comes to a matter of exits, the Boston Building law is one of the most generous in that it calls for an aggregate of forty inches in width for each one hundred people. Unfortunately, however, there are several ways in which the margin of safety is infringed upon. On estimating the number of people, provision is commonly made for only as many as there are seats, which is often one or two thousand under the actual number of people in the auditorium. Furthermore, in making up the total aggregate of width, it has been the custom to allow exterior iron fire-escapes to count as part thereof. Fire-escapes ought to be entirely in addition to what would be considered ample security for the audience, for the number of people who, panic stricken, could with safety avail themselves of the chance to crawl along a fire-escape on a cold, snowy night, with a raging fire on one side, a badly scared crowd behind them, and a dark, uncertain passageway before them, is very slight. As a matter of fact, so far as known there is not a theater in this country whose exits aggregate the equivalent of forty inches in width for each one hundred people who are allowed to enter the house.

Again, the matter of stairs. Most building laws prescribe minimum dimensions of seven and one-half inches and ten and one-half inches for the rise and tread respectively of the steps, a maximum width without intermediate hand-rails of five feet, and a maximum number of fifteen risers in any one run. Such stairs are too steep for a crowd. With fifteen steps in a run, the rise and tread should not be more than five and fourteen inches, respec-

tively. And in proportion as the ratio of these dimensions is changed the number of steps in a run ought to vary, until with seven and one-half inch and ten and one-half inch steps the run should not be more than six or eight steps. At the turn of the flight of stairs the landing should extend out at least one foot beyond the line of rail of the upper flight, and every tread in every flight of stairs which is not carpeted should be edged with Mason Tread or something of that nature.

In some theaters attempts have been made to do away entirely with stairs, substituting a long incline or ramp therefor. There is a theater in Los Angeles in which the gallery and balcony are both reached in this manner, and the recently completed Nixon Theater, in Pittsburg, has a double ramp reaching from the ground floor to the balcony, with a slope of about one in twelve. Both of these theaters were designed by Mr. Marshall, the architect of the Iroquois. It would seem as if such a device would obviate a certain amount of danger from panic. Surely no crowd can with safety be compelled to go down stairs in a hurry.

In more recent theater fires the chief source of danger has generally been something connected with the electrical work, and it is a fact beyond question that electric installations, especially on the stage, are often of a character to invite trouble. A modern stage will consume current at the rate of four or five thousand amperes per hour, and too much care cannot be taken of this extremely important feature of the building. In the first place, the supply to the stage-lights should be entirely independent of all the rest of the house, and the current for the auditorium, the lobbies and the dressing-rooms should not even be taken to the stage switchboard, but should be controlled in another part of the house, so that they could in no circumstances be affected by any accident on the stage. It is customary to depend for protection against overloading entirely upon fuses. These are most unreliable safeguards as applied even under the most careful supervision, and as a matter of actual fact circuits on a stage are generally fused so high that fuses would not melt until after a good deal of damage has been done. Besides, in the hurry of making temporary connections, the stage electricians are by no means always particular as to the kind of fuse which is used, and an interesting collection might be made of various sorts of devices which have been found doing duty as fuses, which would include cold chisels, sections of 0000 wire, hair-pins and ten-penny nails. The only efficient device at present available is an automatic circuit breaker. These

should be installed on every circuit of any size, and if they are used intelligently they constitute a very reliable protection. Exposed arcs of every kind should be absolutely prohibited, and every switch should be enclosed for protection in such manner that sparking at the contacts could not possibly communicate fire to anything.

As regards the exits and passages leading from the auditorium to out-of-doors, they should never be left unlighted for a moment, and the electric wires and the outlets should be so protected that nothing but the destruction of the fixtures could cause a total stoppage of the light. When the panic seized the spectators in the gallery of the Iroquois Theater, and they rushed toward the exits, it was to find the lights all out and they themselves in total darkness. There is no evidence at present public to show whether the lights were turned off by some over-excited attendant, or whether connection was broken by the fire on the stage, but it is perfectly possible to install devices which would be quite independent of either possibility. A small storage-battery can be arranged in shunt with the current supplied to at least one outlet in each corridor and stairway, the battery constantly charging while the lamp is in direct operation from the street current, and lighting up by drawing on the battery when the street supply is cut off. This is a device which costs only a few dollars, and has been installed in some theaters. Something of this kind should be required by law everywhere.

The Boston Building law prescribes that no boiler, furnace, engine or heating apparatus, except pipes, shall be located under the auditorium nor under any passage or stairway of any exit of a theater. This provision does not obtain in Chicago nor in many of our cities. As theaters are almost universally now required to be of fireproof construction, the boiler-room can be made perfectly safe almost anywhere, and the only object in keeping it away from under the stage or auditorium is to prevent its being used as a storeroom for rubbish, which is generally the fate of every compartment, large or small, within reach of the stage manager.

It is safe to say that there is not a theater in this country which fully answers all the requirements of safety indicated above. The laws in several of our cities prescribe that scenery shall be fireproof, but it is never done. The scenery is generally brought to the theater with each company that arrives, and is allowed to go up without a protest from any one. There is an immense amount of rubbish necessarily accumulating all the time about a stage, and

each company usually has some special ideas about arrangement of scenes, and more particularly about the electrical work. Consequently, when a system is put in order, it seldom stays so, and it requires the utmost care on the part of the manager, and an amount of electrical knowledge and ingenuity beyond what is possessed by the average stage electrician, to prevent the stage and the electrical fittings getting in such condition that a slight break or short circuit might, without repression, result in serious damage. To say, however, that a theater cannot be made perfectly secure against fire is to deny the facts. We can build our structures and equipment in such manner that there will be absolutely no danger from fire either on account of scenery or even through carelessness. Then if, in addition to that, our laws compelled us to make our exits on a more generous scale, to give ample lobbies in which a crowd can spread itself out and recover from panic, the liability to such fatalities as the Iroquois Theater would be enormously reduced. Nothing can absolutely guard against the danger of panic. We have only to recall the shocking catastrophe associated with the coronation of the Czar and the panic which seized the crowd on the Brooklyn Bridge to appreciate that it is the people themselves whom the spectators have most to fear. But we can surely head off the panic by making a blaze in the theater an impossibility, and a panic-stricken crowd which has plenty of room to spread itself out will speedily recover from its alarm.—C. H. Blackall, in "The American Architect," January 9, 1904.

UNREST.

Why should we wish or care to know
Why all is changing here below?
Why outward life should ebb and flow?
Or why our thoughts should shift and sway,
And like our dreams should pass away?
We backward turn and lingering yearn
For that which never can return:
For, all our life, our sense of being
Lies in the fulness of our seeing,
Not the fleeting things we borrow,
Or the phantoms of to-morrow,
But the splendor and the play
Of that rich life that's here to-day.

Winchester, Mass., February 10, 1904. —E. A. BRACKETT

MEDICAL EXCERPT.

By T. P. CORBALLY, A.M., M.D.

EPITHELIOMA CURED BY RADIOTHERAPY.—MM. Horet and Desfosses presented to the Société Médicale des Hôpitaux a patient, 64 years old, who had an epithelioma of the face during six years ("Le Progrès Médical," Jan. 23, 1904).

When the patient was examined the first time by the authors of the communication he had all the left wing of the nose eaten by the tumor. The sore measured 3.5 c. in height by 2.5 c. in breadth. The examination after bioscopy confirmed the diagnosis as localized epithelioma.

The treatment employed for the patient was radiotherapy. During the first month it absorbed six unities of the instrument of Holzkniecht, 5 rays of the radiochronometer of Benoist; during the second month it absorbed six unities. The result has been the following: At the end of two weeks the falling away of the crusts, the arrest of the hemorrhages; at the end of the first month the pain disappeared, and at the end of the second month cicatrization was complete.

ACTION OF ROENTGEN RAYS ON ANIMAL TISSUES.—MM. R. Lèpine and Boulud have, at the Académie des Sciences, found that fragments of the pancreas of a dog exposed to the Roentgen rays manifested a power of reduction much stronger than similar pieces left shaded from these rays. The difference exceeded in one case 25 per cent: the average in five tests was 12 per cent. Exposed to the rays during less than an hour the pulp of the dog's liver holds almost always less glycogen and more sugar than is found in the pulp, and the sum of the glycogen and the sugar is also less. The first effect of the X-rays is to favor the glycogenic and the hypatic glycolyses. But when the exposure has been prolonged beyond an hour the conditions are reversed and the glycogenic and the hypatic glycolyses are diminished. The conditions hold the same for the blood, in which case the glycogen and the glycose are at first favored by the Roentgen rays, while the radiologic action, more or less prolonged, diminishes, and may, perhaps, arrest both.

HELENIN IN EMPHYSEMA.—M. Marey ("Le Progrès Médical," March 5, 1904), describing the treatment of emphysema by helenin, says: Under the influence of this agent the entrance of air into the pulmonary vesicles ceases to be obstructed, and respiration is performed freely; a result that Dr. de Korab has determined often, not only by percussion and auscultation, but also by means of polygraph, an instrument for registering, invented by M. le Professeur Marey, which Professeur Constantin Paul placed at his service at the Lariboisière. The oppression ceases and the breathing becomes, as he explains it, like the traveler ascending the hills in upper Austria. Thus he expresses the freedom of breathing as the result of the beneficent action of helenin in emphysema.

UNDER THE HEAD OF PRACTICAL MEDICINE, "Le Progrès Médical" has the following on:

HELENIN AND ITS THERAPEUTIC APPLICATIONS.

Helenin, a solid body, crystallized in quadrangular, colorless prisms, insoluble in warm alcohol, ether, the essences, kereosolene, gives very remarkable therapeutic results which have been well described by Dr. de Korab in divers communications, notably to the Société de Biologie and to the Académie des Sciences. It calms the cough, lessens the expectoration, facilitates the respiration, is possessed of a real power as a bactericide. It possesses, besides, a preventive and a curative action in hemoptysis; it excites the appetite, aids digestion. It is, in fine, the reliable remedy in chronic bronchitis and in pulmonary tuberculosis. It is prescribed under the form of globules d'helenine des Dr. de Korab à la de 3 à 6 par jour.

THE MEASURE OF THE PHYSIOLOGICAL ACTIVITY OF THE KIDNEYS.—M. le Prof. Gréhant presented a communication to the Société Française d'Hygiène recently, giving the results of his studies on the variations of urea in the blood and in the urine. He commenced these studies years ago, for they were the subject of his thesis for the degree of sciences in 1870, and have led him to conclusions of great importance.

He uses in his experiments an apparatus designed by himself, of which he gave a description. He uses the action of nitrous vapors on the urea, and employs as a reactive a solution of 0.8 gr. of metallic mercury in an excess of nitric acid.

The results obtained are rigorously accurate and the reaction

is produced only for the urea, as is shown by the respective quantities of nitrous and carbonic acids produced.

With this exact method of dosing the urea it is possible to measure the physiological activity of the kidneys by establishing the relation between the quantity of urea contained in the blood and that contained in the urine.

The normal relation for the dog is 1.124 c., showing with what activity the elimination of urine is made by the kidney.

M. Gréhant was unable to determine this relation in man because of the difficulty of obtaining the blood in a normal state in a healthy person, but he found that it varies considerably according to the condition of the kidneys. This was the case in an example furnished to him by M. Widal. After the death of a man caused by an accident it descended to 1.10 c., the respective quantities of urea being: for the blood, 0.155; for the urine, 1.55. In this case the urea was in proportion much higher in the blood than in the normal condition.

M. Lematte asked if the reaction is disturbed by other nitrogenous compounds in the urine.

M. Gréhant replied in the negative. The equality of the volumes of carbonic and nitrogen furnished by the reactive showed clearly that we had to deal with the products of the decomposition exclusively.

M. Foveau de Courmelles asked if M. Gréhant had studied the urine of vegetarians.

M. Gréhant said the urine of herbivorous animals, as the rabbit, for example, contains much less urea than carnivorous animals. As for vegetarians, he had not had the opportunity to study their urine.

M. Ed. Joltrain feared that the ureic report viewed by M. Gréhant was not sufficient to give a complete picture of the renal activity. There were morbid states in which the kidneys certainly injured, as in the case of epithelial nephritis, allowed the urea normally, while retained in the economy almost absolutely.

M. Gréhant replied that his studies had thus far led him exclusively to the relations of urea; his procedure, very exact in dosage, allowed him to obtain results very precise.

M. le Dr. Bremond asked if in these conditions M. Gréhant would be disposed to modify the title of his communication, by putting "Measure of One of the Elements of Activity," etc.

M. le Prof. Gréhant accepted this modification of form.

The president thanked M. le Prof. Gréhant for his interesting communication, and all the members present expressed their agreement by loud applause.

CARBONIC ACID TREATMENT OF TUBERCULOSIS.—In bringing forward his carbonic acid treatment of tuberculosis, Hugo Weber ("Zeit. f. Tuberc. u. Heilstättenwesen," Vol. LV, No. 6, and "British Medical Journal," Nov. 7, 1903) says that he influences the disposition and thus indirectly destroys the bacilli. The sanatorium treatment aims in the same direction. If one speaks of improving the nutrition and the general bodily strength, or of an increased carbonic acid production, one speaks of the same thing. He reports 60 per cent. cures, and states that he is careful to take the term "cure" in its strictest sense, and is prepared to demonstrate his cases. The principle is the antagonism between CO_2 and phthisis.

Turning to the method of CO_2 production, Weber finds that the best is the exhibition of levulose, which can even be oxidized by diabetics. He found that it is not rare to obtain in a week an increase in weight of 300 or 400 grams by giving levulose to weakly children. He describes several cases of tuberculosis in which levulose acted almost magically, especially one of a child of 8 years to whom he gave four teaspoonfuls of levulose a day, and succeeded in arresting and curing a seemingly hopeless case. One can almost effect a cure with levulose alone in adults, but in some cases, if no improvement takes place, he injects perfectly pure liquid paraffin, subcutaneously, in doses of 10 ccm. twice a day. Sometimes it is necessary to give as many as 200 injections. They must be made beneath subcutaneous adipose layer and not merely beneath the skin. He hopes soon to be able to report on 50 further cases which will give the same percentage of cures as his first 55 cases did.

NEW ANÆSTHETIC.—Hungarian dentists and chemists claim to have discovered a valuable local anæsthetic, an alkaloid, "nervocidine," the hydrochloride of which is stated to have properties similar to cocaine, but to produce a much more lasting anæsthesia. The base is obtained from an Indian plant, "gasu basu," the properties of the leaves of which were first discovered by Dalma, who successfully employed them in painful pulpitis with such good results that he reported that the drug might displace arsenic for

dental purposes. B. von Fenyvessy has investigated the properties of the alkaloidal hydrochloride, as prepared by Dalma, which is yellow, amorphous, hygroscopic powder, readily soluble in water. It produces marked anæsthesia of the cornea in a 0.1 or 0.2 per cent. solution, which is very persistent, and a 0.1 per cent. solution brushed on the mucous membrane of the cheek also gives marked anæsthesia. Stronger solutions, exceeding 0.5 per cent., produce irritation of the cornea, and a 2 per cent. solution causes ulcerative keratitis in dogs and rabbits, which lasts ten days, during which period the anæsthesia also lasts. It does not appear to produce anæsthesia by subcutaneous injection. Its general effect is that of a paralyzing poison. Although its anæsthetic effect is much more prolonged than that of cocaine, the length of time necessary before this effect supervenes, the irritation caused by the drug, and the toxic symptoms it produces do not point to the probability of its being of general service, except perhaps in dental practice.—From United States Consul-General Hughes, Coburg, Germany, Sept. 21, 1903.

PURIFICATION OF MILK BY OZONIZATION.—An apparatus in use in Germany for the purification of milk by ozonization is so constructed that the milk contained in a vessel flows thence in a thin stream into another vessel, placed below. The wires and carbon points of a strong electric battery are so arranged that the light arc passes through the stream or near it. The ozone which is thereby engendered from the oxygen of the air is said to be sufficient to kill all micro-organisms contained in the milk.—Richard Guenther, Consul-General, Frankfort, Germany, October 14, 1903.

THE CURABILITY OF TUBERCULOSIS.—When Dr. Victor C. Vaughan, Dean of the Medical Department of the University of Michigan, was speaking before the members of the Shiawassee County Medical Society, recently, he startled them by remarking that consumption is the most easily curable of any of the so-called serious diseases. He took the view that only the hopeless cases come under the care of a physician, and that when his advice is sought the patient is already so debilitated as to be unable to withstand the assaults made on the system by the disease. His statements provoked a warm discussion, but Dr. Vaughan stuck to his text.—"Detroit Medical Journal."

EDITOR'S TABLE.

SANITARIAN, APRIL, 1904.

All Communications, business and otherwise, all exchanges and all publications for review should be addressed to the Editor, Dr. A. N. Bell, 337 Clinton Street, Brooklyn, N. Y.

HEALTH INSPECTORS.

An excellent bill is before the Legislature of New York, at the time of this writing, for the grading and increase of pay of inspectors on the staff of the Board of Health of New York City, which merits the support of all public-spirited citizens. It amends the charter of New York by the addition of a section providing that on and after the first day of January, 1905, all Health Department Inspectors who have been for fifteen years in that work shall be classified in the first grade; those of ten and less than fifteen years' service in the second grade; those of from five to ten years' service in the third grade, and all of less than five years' service, including all who may hereafter be appointed, in the fourth grade. Continuous and faithful service will entitle an inspector to be advanced from a lower grade to a higher one as he passes the five, ten and fifteen year periods respectively. The pay of the several grades is fixed as follows: Fourth grade, $1,200 per annum; third grade, $1,500; second grade, $1,800; first grade, $2,100. These salaries are subject to such deductions for sickness, absence on vacation, fines and forfeitures as the Board of Health shall prescribe by rules applicable to all grades alike.

The work of the Health Department is a service of experts. It calls for special knowledge, and in no branch of the public work is experience more valuable. It is not to be expected that any one qualified to pass the civil service examination and undertake the duties of an inspectorship can be had for less than $1,200 a year. He should be a physician or an engineer, and to secure promotion he must give up all opportunity for another career. If after five years he is not worth $1,500 he does not belong in the service; and if after fifteen years, by which time the average inspector will have reached or passed forty, he cannot be sure of a salary of $2,100 at least, he has absolutely no incentive to make the work of the department more than a temporary convenience, to be aban-

doned as soon as any other opportunity is offered. Above all things, the faithful inspector who attends to his duties and not to his "pull" must be protected against the injustice of remaining stationary in his position and salary while new men with more potent influence are appointed at higher salaries and put over him.

The efficiency of the public sanitary administration depends upon the judgment and experience of our health inspectors. If they are inefficient or corrupt the Board of Health is powerless. The salary demands of the inspectors are extremely moderate, and the principle for which they contend in urging the enactment of the bill referred to is too sound to permit discussion.

THE SPITTING NUISANCE.

Health Commissioner Darlington has caused public announcement to be made that no further leniency is to be shown toward violators of the provision of the Sanitary Code that makes spitting in public a misdemeanor. Officers of the Health Squad have been ordered to make summary arrests in all cases. The abominable habit of voiding the nasal secretions by blowing the nose on the sidewalk without the use of a handkerchief is rapidly growing as must be evident to any one with habits of observation. Whether or not that shares with spitting in the prohibition we do not know, but if not, it should be specifically included, for a more disgusting practice does not exist.

ANOTHER THEATER ORDINANCE—NEW REGULATIONS FOR SAFETY

Alderman Harburger, the Chairman of the Aldermanic Committee on Buildings, at a recent meeting of the Board presented a report from his committee favoring an ordinance to amend the building code in regard to theater construction.

The amendments ordain that the front entrance shall be not less than 25 feet in width; there shall be an open court of not less than 10 feet in width in the rear in houses of less than 1,800 capacity, and not less than 14 feet where the capacity is greater; the staircase from the upper gallery shall be not less than 4 feet wide in the clear; the aggregate capacity of the foyers, lobbies, corridors, passages and rooms for the use of the audience, not including aisle space between seats, shall be sufficient to contain the entire number to be accommodated on said floors or galleries in the ratio of 150 superficial feet of floor room for every 100 per-

sons; on the first or main floor where the seating capacity is 500 or more there shall be at least 16 feet clear back of the last row of seats.

The report was referred for a week under the rule, as was another report from the same committee fixing 75 feet as the height beyond which buildings may not be erected unless absolutely fireproof.

TO FIGHT TUBERCULOSIS.

Under the auspices of the United Garment Workers of America a conference on tuberculosis was held on the 13th ultimo, at the Educational Alliance, on East Broadway. There was a large attendance. Henry White, Secretary of the United Garment Workers, presided. The speeches, in Yiddish and German, were delivered by Dr. A. Jacobi, Dr. David Blaustein, Superintendent of the Educational Alliance, and Joseph Barondess.

Paul Kennaday, Secretary of the Committee on Conventions on Tuberculosis of the Charity Organization Society, explained the object of the conference, saying:

"We are not assembled to-night to fight contractors, but to fight the greatest enemy of mankind. It is a disease which kills thousands every year, and most of its victims in this city are people of the East Side. It is no more than a germ, a tiny bit of life that can only be seen through a powerful microscope. You could bring thousands of them together, and they could not be seen by the naked eye, and they are the more dangerous because they cannot be seen.

"This enemy can be successfully fought by preserving caution. We can defy this germ by keeping ourselves, our living rooms, and our workshops clean. It thrives amid dirt, and by removing uncleanliness we can emancipate ourselves from the disease."

TUBERCULOSIS SEASIDE PLAN.

Tuberculosis is to be attacked in a new quarter by the New York Association for Improving the Condition of the Poor, 105 East 22d street, which has appropriated $15,000 for the maintenance at the seaside of children less than 15 years old, who suffer from non-pulmonary forms of the disease. This will be the first seaside hospital exclusively for tuberculous children in America, although in France such cases are, as a rule, treated at the seaside, it being generally held by experts that the ocean air is the best for such patients whose lungs are unaffected.

There are said to be nearly 4,000 children in the New York tenements suffering from scrofula, tuberculous joints and lymph lobes. Several hospital beds have been provided for them, and the New York Orthopædic Hospital and the Society for the Ruptured and Crippled give special treatment, but the new hospital appears to be a much-needed institution in the same field.

The Association makes the experiment on the strength of reports to its Board of Managers, by John Seely Ward, Jr., who has studied the subject abroad. Herbert Townsend, President of the State Hospital for the Treatment of Incipient Tuberculosis, will be chairman of the new hospital, which is to be maintained with funds contributed to the fresh-air work, and not from those given for general relief purposes.

THE NEW MOUNT SINAI HOSPITAL A MODEL OF SANITARY SCIENCE.

The new Mount Sinai Hospital was thrown open for inspection March 11th. The buildings, with the air-space courts, occupy the block extending from Madison to Fifth avenue, and from 100th to 101st street, ten buildings in all, connected by corridors on the ground floor, with the exception of the isolation house, designed for the accommodation of persons suffering from contagious diseases. Millions of dollars in donations from the poorest to the richest of the Jewish population of New York are crystallized in the marbles and enameled tiles of the big structure.

Except in the monumental, or structural, portions of the buildings, there is an utter absence of sharp corners, or angles, thus minimizing dust accumulation, and making cleansing easy. Another evidence of the care for cleanliness is in the number of porcelain bath-tubs, these being ninety-six. In addition there are portable baths for each of the many wards. The construction of the buildings that will comfortably house 456 patients has been entirely designed with the idea of light, ventilation, disinfection and isolation.

The roofs of the medical, surgical, private hospital, the children's and isolation houses have been provided with glass inclosures for convalescent patients. These may be opened in fair, warm weather.

Perhaps the most interesting is the administration building. In the basement are the visitors' waiting-room, dining-rooms, pantries for the resident, lay and medical staffs, and storerooms. On the first floor are the reception and examining-rooms, together with quarters for the various resident officials. On the second

floor are the rooms, magnificent in quartered oak, of the Board of Directors, the committee, and the ladies' auxiliary. The latter has an ante-room filled with every sort of linen, cotton and woolen goods, to be sewn into garments for the patients.

On the third floor is a synagogue, with a seating capacity of two hundred.

The fifth floor is almost exclusively devoted to operating rooms, the central one being dedicated by Benjamin Stern to the memory of his brother, Bernard Stern. It is built entirely of Italian marble, with the exception of its large window panes and floor of vitreous tile. There are two tiers of seats, reached by galleries from the floor above. On either side of the operating-room, with its ceiling seventeen feet above the floor and forming a marble dome, are rooms fitted with blanket warmers and dust-proof instrument caskets. In addition there is a room for sterilization. Everything known to modern medical science is included in the equipment. The same is true of the four additional and smaller operating-rooms on this floor. There is a photographic darkroom and an X-ray room, with cabinets for filing radiographs.

The Medical Building, to the east of the Administration Building, has in its basement a complete modern hydrotherapeutic department. There are also emergency wards for the temporary care of accident cases. Here are the 550 lockers where the disinfected clothing of patients is kept until the discharge of patients.

Two rooms containing two beds each have been dedicated by Max Nathan and E. Asiel, respectively; the former is for use of alumnæ of the Nurses' Training School; the latter, intended for general medical purposes, was dedicated in memory of Lina Asiel.

The pantries are reached directly by the freight elevator, upon which the food is brought up from the kitchen in electrically warmed trucks. Each pantry is fitted out as a small kitchen, with gas-range, large copper sink, porcelain-lined refrigerator (fed with brine from the central refrigerating plant), a steam-heated plate warmer, an outlet for carbonated water (a machine for the manufacture of which is located in each building), and closets for dishes and other supplies. There are also coffee grinding and icecream-making mechanical plants.

In the Surgical Building there is a ward of twelve beds, endowed by Miss Rosie Bernheimer, and an eye and ear department of nineteen beds. On the third floor are the Joel Goldberg and the Isaac Blumenthal wards.

The private pavilion dedicated by the members of the Guggen-

heim family to the memory of Barbara Guggenheim fronts on Fifth avenue. The five floors are divided into single rooms and suites of rooms with bedroom, bathroom, and a connecting parlor. There are accommodations for fifty-three private patients. On the fifth floor there is an isolated suite of rooms for operating purposes.

The Children's Pavilion, dedicated to the memory of his son Lewis, by Henry L. Einstein, has on its four upper floors wards of fourteen beds each—bright, cheery rooms—that are fully furnished to the smallest details, such as little tables and chairs for the patients who can be taken from their beds for play.

The Pathological Department, through the endowment of Adolph Lewisohn, is a completely equipped building. The furniture is of quartered oak. The Nurses' Building, fronting on Madison avenue, affords accommodations for 150 student nurses. On the sixth floor there are four rooms isolated as an infirmary and kitchen for sick nurses.

The Dispensary is fitted up with various departments for the treatment of ambulance cases. There are to be two ambulances

MORTALITY AND MORBIDITY REPORTS AND REVIEWS.

OBITUARY.

DR. MOREAU MORRIS died, March 17, at his residence, on East 73d street. He was born at Stillwater, June 19, 1825, and was graduated in 1848 from the College of Physicians and Surgeons. In 1866 Dr. Morris was appointed Health Commissioner, and from 1870 to 1872 served as Superintendent of the New York City Health Department and State Cattle Commissioner. In 1871 he became Surgeon of the Seventh Regiment, N. G. S. N. Y., and served until 1884. Immediately following his retirement from the National Guard he was appointed Tenement-House Commissioner. On the conclusion of that service, a few years later, he became associated with and was medical director of the American Popular Life Insurance Company. Soon after the failure of the company, in 1879, he again took office in the city health service, and continued in it up to the time of his death, being at that time special medical inspector of all institutions having the care of children.

Dr. Morris' contributions to literature were chiefly on sanitary subjects, particularly on house and soil drainage, and for the most part to the early volumes of THE SANITARIAN. He was married in April, 1848, to Lydia C. Thayer, who died about a year ago, and has left two children.

Dr. Morris was a member of the Seventh Regiment Veteran Association, of the American Public Health Association, of the Alumni of the College of Physicians and Surgeons, and of the Academy of Medicine.

STATE OF NEW YORK.—Monthly Bulletin, Department of Health, for January, 1904, 7,735,000: Total number of deaths, 12.238; annual death rate, 18.7; deaths under 1 year, 1,750; deaths 1 to 5 years, 1,139; deaths at 70 years and over, 2,447; deaths from cerebrospinal meningitis, 43; typhoid fever, 129; malarial diseases, 9; smallpox, 3; scarlet fever, 161; measles, 95; erysipelas, 36; whooping-cough, 22; croup and diphtheria, 318; diarrheal diseases, 193; consumption, 1,187; pneumonia, 1,510; acute respiratory diseases other than pneumonia, 1,097; puerperal diseases, 106; diseases of the digestive system (not acute diarrhea), 644; diseases of the urinary system, 991; diseases of the circulatory system, 1,334; diseases of the nervous system, 1,319; cancer, 459; accidents and violence, 540; old age, 463; general diseases not epidemic (except consumption and cancer), 470; unclassified, 1,164.

A few changes in the classification have been made to correspond with the international classification.

Diarrheal diseases will hereafter be limited to a record only of those occurring under five years of age, and of this reporters are requested to make note. This change is made on advice of those interested in the subject of pediatrics; it is not likely to materially change this record of mortality from that heretofore made, and will make exact what shall come under this head.

Under the term *general diseases* the international classification includes (A) epidemic diseases, and (B) other general diseases. Heretofore no attempt has been made to make a record separately of the latter. They are now taken out of the unclassified group and made a special record of, *i. e.*, all of them not already specially recorded. Consumption (pulmonary) is one of these, and, as heretofore, will include tuberculosis of the lungs and larynx; cancer, likewise, of whatever part, will remain as a record. With these exceptions, the records of general disease now made will in-

clude death from diseases specified in the census classification tuberculosis, other than pulmonary; Pott's disease, cold abscess white swelling, scrofula; septicæmia, glanders, rabies, trichinosis syphilis, rheumatism and gout, diabetes, scurvy; exophthalmic goitre, Addison's disease, anæmia and chlorosis; alcoholism, acute and chronic; chronic poisoning from whatever cause and other general diseases, all as noted on the classification list. Most of this has heretofore gone into the unclassified group, beside which it is now placed for ready comparability with past records.

Pneumonia will be taken out of the group of acute respiratory diseases and given a separate record. Its growing importance in sanitary affairs makes this desirable. It is to be understood that this term includes only acute lobar croupous pneumonia, and that it does not include catarrhal or broncho-pneumonia. While many prefixes to this name appear on our death returns, it is pretty safe to say that physicians generally understand the distinction as to the infectious disease we desire to specially record.

New York City, 3,838,024.—Total number of deaths, January 6,871—annual death rate, 21.0: Borough of Manhattan, 1,940,121; deaths, 3,858—death rate, 22.7. Borough of the Bronx 294,939; deaths, 491—19.6. Borough of Brooklyn, 1,334,952 deaths, 2,138—18.9. Borough of Queens, 193,494; deaths, 255—15.7. Borough of Richmond, 74,518; deaths, 125—20.0.

Vital Statistics for 1903.

A complete statistical report of deaths, marriages and births in Greater New York during the year 1903 has just been issued by Commissioner Darlington of the Board of Health. The report shows that all told there were 67,864 deaths from various causes during the year ending December 31, 1903. It also shows that during the same period there were 94,755 children born. There were 31,174 marriages recorded during the year. The average death rate in all the boroughs was 18.18.

Perhaps the most interesting feature of the report is contained in the column devoted to smallpox. It shows that during the entire year there were but 43 cases reported, from which but five deaths resulted. Twenty-four of the cases were reported from Manhattan and 15 from Brooklyn. These figures go a long way to demonstrate the excellent results that have been attained by proper vaccinations.

The report shows that 9,714 deaths occurred during the year from pneumonia, 3,313 of which were from broncho-pneumonia.

There were 5,831 deaths from pneumonia in Manhattan, as against 2,910 in Brooklyn. From various forms of tuberculosis 9,403 deaths resulted in the greater city, of which 8,019 were from consumption. Four thousand seven hundred and twenty-one tuberculosis patients died in Manhattan, against 2,801 in Brooklyn. Typhoid fever carried off 653 victims throughout the city of the 3,671 cases reported. Of diphtheria and croup, there were reported altogether 18,317 cases. Of these, 2,190 died. Nephritis and Bright's disease claimed 5,636 victims during the year, 2,440 of which were in Manhattan, and 2,123 in Brooklyn.

There were 4,068 violent deaths reported, of which 805 died by their own hands. In Manhattan 462 despondent men and women ended their earthly struggles in various ways, mostly by carbolic acid, while in Brooklyn 234 persons found life not worth the struggle.

Of the grand total of deaths, 22,044 were children 5 years old or under. There died in Manhattan 12,529 children under 5, and in Brooklyn, 7,068. A sliding scale of deaths according to ages, ranging in 5 year groups, running from 5 to 85, shows that the greatest number of deaths reported were from persons between the ages of 30 and 35.

CALIFORNIA.—San Francisco's New Board of Health.—On January 9, 1904 ("Occidental Medical Times" for February), "the following gentlemen, being duly appointed by Mayor Schmitz, were enrolled with the power to manage the most important branch of the local government: James W. Ward, homeopathist; J. Coplin Stinson, regular; J. F. Poheim, regular; J. V. Hughes, regular; William A. Harvey, eclectic. On entrance to the room, each member of this board was handed a resolution declaring certain positions void, and, under another name, they were immediately filled. Two-thirds of the employees were removed at one blow. An upheaval was expected, but its unwarrantableness and rapidity were startling. . . . It was claimed, by such wholesale removal of the old appointees, the expense of the office could be reduced twenty thousand dollars per year. The truth, however, shows that, with the appointments made so far, the absolute reduction was about four thousand dollars. . . . A comparison then of the salaries of the civil service men discharged and those employed to take their places showed an apparent reduction of twenty thousand dollars. But in order to supply the department with sufficient force, the small number of non-qualified em-

ployees of the old board had to be increased to the tune [redacted] eighteen thousand dollars per year, which almost wiped out the [redacted] claim for a reduction of even four thousand dollars, which w[redacted] surely be done when the service is raised to its necessary numbe[redacted] . . . Mr. Schmitz has for two years violated law, and eve[redacted] form of decency, to negative the work of the retiring board; h[redacted] has opposed every effort for improvement, advance, or the truth[redacted] he has abused and condemned these men on all occasions, and h[redacted] appointed successors to them, between whom and the members [redacted] the old board a comparison would be decidedly insulting. . . The Board of Supervisors has advised their removal; the profe[redacted] sion should stand up to a man and demand it. The blow give[redacted] the profession by these acts is by no means so embarrassing as th[redacted] administered the civil service; men standing high, lawfully a[redacted] efficiently, in these ranks, were removed without a word or tria[redacted]."

Plague.—Cases reported in February, 6; March 1st, 2.

Los Angeles, 160,000.—Health report for February: Death[redacted]s 289—32 under 5 years; death rate, 21.67. From specific infe[redacted] c tious diseases, 92; tuberculosis, 67—"15 had lived here less th[redacted] three months, 10 between three and six months, 4 between s[redacted] and twelve months, 14 between one and five years, 5 between fi[redacted] and ten years, 12 over ten years, unknown 4, life 3."

COLORADO.—Denver, 175,000. Report for December: Death[redacted] 260; premature and still births, 10; 51 under 5 years; death rat[redacted] per annum, 17.82. Deaths from phthisis, 52—2 contracted els[redacted] where; typhoid fever, 6 cases, 5 deaths; smallpox, 12 case[redacted] chickenpox, 3 cases; diphtheria, 45 cases, 2 deaths; scarlet feve[redacted] 56 cases, 5 deaths; measles, 48 cases; erysipelas, 10 cases, 2 death[redacted] deaths from heart diseases, 11; pneumonia, 41; broncho-pneu[redacted] monia, 2; nephritis, 9; cancer, 9.

CONNECTICUT.—Bulletin for January: Deaths, 1,428—82 mor[redacted] than in December, and 8 more than in January of last year, an[redacted] 35 more than the average number of deaths in January for the five years preceding. The death rate was 17.8 for the large towns; for the small towns, 19.6; for the whole State, 18.3. Deaths reported from infectious diseases, including diarrhea, 308 —21.5 per cent. of the total mortality.

Cases of infectious diseases reported: Measles, 1,736 cases in 69 towns; scarlet fever, 180 in 43 towns; diphtheria and croup,

138 in 33 towns; whooping-cough, 65 in 10 towns; typhoid feve 36 in 18 towns; consumption, 37 in 13 towns.

DISTRICT OF COLUMBIA, 300,902—91,603 colored. Report fo the week ended on Saturday, March 5, 1904, numbered 16 which is but 1 more than occurred during the previous week an 15 more than occurred in the corresponding period of la year. Of the recent deaths 101 were white and 59 were co ored. These represent a death rate of 24.8 per 1,000 of the whi inhabitants, 33.5 of the colored, and a death rate for the enti population of 27.5. These rates for the corresponding period 1903 were 21.8, 32.6 and 25.3, respectively. The prevailing di eases responsible for deaths during last week were: Pneumoni 28; consumption, 21; heart diseases, 14; diseases of the kidney 10; apoplexy, 9; bronchitis, 6, and malignant growths, 6.

There was an increase in the number of cases of typhoid feve viz., from 31 to 39, there being 10 new cases reported, and but discharges.

Of scarlet fever there was a decrease during the week of 5 the number of cases; 11 cases developed and 16 were discharge which leaves 60 cases in all, quarantined in 37 different premise

The cases of diphtheria were increased by 5. Six new cas were reported, with but 1 discharge, leaving a total number und observation of 18, quarantined in 8 premises.

ILLINOIS.—Chicago. Statement of mortality for the month February, 1904, compared with the preceding month and with th corresponding month of 1903. Death rates computed on estima ed mid-year populations of 1,950,000 for 1904, and of 1,820,0 for 1903:

	Feb., 1904.	*Jan.,* 1904.	*Feb.,* 1903.
Total deaths, all causes.....	2,705	2,361	2,570
Annual death rate per 1,000..	17.92	14.24	18.30
By ages:			
Under 1 year.....	499	439	451
Between 1 and 5 years.....	215	180	291
Over 60 years.....	618	533	579
Important causes of death:			
Acute intestinal diseases.....	91	83	97
Apoplexy	63	64	52

Bright's disease	165	156	150
Bronchitis	141	123	138
Consumption	278	248	242
Cancer	100	85	85
Convulsions	73	59	70
Diphtheria	38	40	50
Heart diseases	195	205	191
Influenza	31	22	38
Measles	0	1	21
Nervous diseases	104	95	108
Pneumonia	686	504	580
Scarlet fever	26	15	33
Smallpox	0	1	11
Suicide	32	31	41
Typhoid fever	33	30	54
Violence (other than suicide)	116	110	89
Whooping-cough	0	1	35

Report of the State Board of Health, 1903: Medical Education and Official Register of Legally Qualified Physicians. The laws governing this board and the regulations in virtue of those laws, summarized in this report, attest the justness of accorded leadership to this board in the promotion of medical education and for efficiency in maintaining the highest standard of State medicine in the United States. It comprehends the requirements for medical practice in the United States, medical practice acts of the several States, schedule of reputable medical colleges, decisions of Illinois courts on criminal and questionable practices, advertisers, vendors, etc.; quarantines, liabilities of municipalities for needful restrictions and responsibilities; in short, the volume is replete with practical knowledge on State medicine fortified by law.

INDIANA.—The January Bulletin of the State Board of Health: 3,177 deaths—14.8 per 1,000. In the corresponding month last year there were 2,910 deaths; rate, 13.2. By certain ages the deaths were: Under 1 year, 493, or 16.4 per cent. of the total number; 1 to 5 years, 226; 65 years and over, 930, or 30.9 per cent. of the total. By certain causes: Pulmonary tuberculosis, 361; other forms of tuberculosis, 37; typhoid, 38; diphtheria, 45; scarlet fever, 25; measles, 38; whooping-cough, 7; pneumonia, 540;

diarrheal diseases, 23; cerebrospinal meningitis, 41; influenza, 50; puerperal fever, 15; cancer, 103; violence, 132; smallpox, 8.

City and Country.—The city rate was 18.8, and the country, 12.8. Seventeen per cent. of city deaths were under 1 year of age, and 15.9 per cent. in the country. For old people, however, the rates were: Country, 34.3 per cent., and cities, 26.5. The cities showed a higher rate than the country in tuberculosis, typhoid, diphtheria, scarlet fever, pneumonia, diarrheal diseases, cerebrospinal meningitis, puerperal fever and violence. The country rates were higher for measles, whooping-cough, influenza and cancer.

Tonsillitis was the most prevalent disease, and measles the next most prevalent. Pneumonia was very bad, for it stands fourth and caused 540 deaths. The dreaded cerebrospinal meningitis was the least prevalent. The reports show more typhoid fever than is usual in January. A complete sum-up makes plain the fact that the public health this January was not so good as the same month last year.

LOUISIANA.—New Orleans, 317,000—84,000 colored. Report for February, 1904: Total deaths, 419 white, 213 colored—632; deaths under 5 years—white, 74; colored, 40. Death rates: white, 21.58; colored, 32.85: 24.56. Deaths from typhoid fever, 5 white, 2 colored; influenza, 32 white, 13 colored; tuberculosis of the lungs, 43 white, 46 colored; pneumonia, 51 white, 40 colored; Bright's disease, 27 white, 13 colored; cancer, 19 white, 5 colored; senile debility, 22 white, 3 colored.

MASSACHUSETTS.—Boston, 600,929. Health Department report for December, 1903: Deaths, 934—238 under 5 years; annual death rate, 18.65. Deaths from typhoid fever, 13; measles, 10; scarlatina, 8; whooping-cough, 6; diphtheria, 15; tubercle of the lungs, 103; cancer, 43; organic diseases of the heart, 101; bronchitis, 30; broncho-pneumonia, 38; pneumonia, 108; nephritis, 32; Bright's disease, 17; early infancy—congenital debility, icterus and sclerema—56; other diseases appertaining to infancy, 15; senile debility, 26; accidental traumatisms, etc., 32.

Summary for 1903: Total deaths, 10,632—595 under 5 years; death rate, 17.69. Deaths from zymotic diseases, 2,797—26.30 per cent. of total mortality; diphtheria and croup, 214; erysipelas, 34; influenza, 83; measles, 50; pulmonary and laryngeal tuberculosis, 1,205; scarlatina, 65; smallpox, 13; typhoid fever, 119;

whooping-cough, 108; cancer, 511; Bright's disease, 187; bronchitis, 288; heart disease, 992; pneumonia, 1,265; old age, 287; violent deaths, 575.

Report of the State Board of Health for the year ending September 30, 1902—volume of 649 pages. General health of the State: "In the report for 1901 it was stated that the death rate of the State in that year was the lowest ever recorded. That of 1902, so far as can be estimated from the returns made to the Secretary of State, was still lower, the deaths having been only 47,491, out of an estimated population of 2,937,600, which is equivalent to only 16.17 per 1,000 of the living population. The lowest death rates in any previous years of the last half of the nineteenth century were 17 per 1,000, in 1867; 17.33 in 1859, and 16.82 in 1901. The highest death rate in any year of the half century was that of 1872, which was 22.85, while that of 1849, in the previous half century, was probably still higher. Death rates in the first half of the last century were probably much greater than they were in later times, in consequence of the greater prevalence of infectious diseases."

Thus it appears that the decrease is almost wholly attributable to the decreased death rate from infectious diseases, including tuberculosis and pneumonia, more than compensating for the increased mortality, during recent years, from diseases of the heart, brain and kidneys, and cancer.

The reduction of the death rate from "consumption" from 4.2 in 1853 to 1.59 per 1,000 in 1902, even if in part due to improved registration and diagnosis, means enormously improved sanitation; and the very low typhoid rate, 0.183 per 1,000, has the same significance.

As heretofore, the greater part of the report is devoted to the discussion of questions affecting water, water supplies, sewerage and disposal of sewage and refuse, and to the advice given in individual cases by the board to cities and towns and corporations on these vital questions. On these matters the reports of the board have become the first authority, both in this country and in Europe, and are of the utmost practical value.

There were examined during the year, by the board's officers, 6,256 samples of milk, 3,090 of other food than milk and 1,124 of drugs—in all 10,470, of which 2,989, or 28.1 per cent., were found not to conform to the legal standard; and there were 76 prosecutions, with 74 convictions. A list of 61 tonics and bitters is given, in which from 6 to 47.5 per cent. of alcohol was found.

In the eight years of that work, the board has manufactured and distributed 181,174 bottles of diphtheria antitoxin. Their records show a fatality of only 6.7 per cent. of cases treated during the first two days of the disease, 9 for the third day, 12.9 for the fourth, 15.9 for the fifth and 17.6 for the sixth and later.

There were 928 specimens of sputum and other material examined during the year for the bacilli of tuberculosis; 217 of blood, for typhoid fever, of which 65 were positive, and 61 for malaria, in 17 per cent. of which the malaria parasite was found.

The sanitary legislation for the winter of 1902-1903 records material advances in requiring from the towns monthly instead of yearly reports of vital statistics, thus securing much greater accuracy—relative to the destruction by boards of health of infected material; requiring an investigation and report on garbage and refuse dumped into sea or tide water; in regard to the sale of renovated butter; on separate systems of drainage, inspection of food and drug laws; relative to production and distribution of antitoxin and vaccine lymph.

A new office of the board has been created to collect information with regard to matters of public health, to investigate epidemics and high death rates and to bring the board into closer relations with local boards. Dr. F. L. Morse has filled the position to the great advantage of sanitation.

The statistical summary of disease and mortality, the usual comments on the health of towns and an admirable index complete the report.

The confidence of the community in the board and its high valuation of the work done are indicated by the generous appropriations of the legislature, for the year 1902, of $23,000 for general expenses of the board; of $11,500 for inspection of food and drugs; of $34,000 for the protection of the purity of inland waters; and of $2,500 for the examination of sewer outlets.

MICHIGAN.—The total number of deaths reported to the Secretary of State, for February, was 3,389, an increase of 263 over the preceding month. The death rate rose from 14.7 in January, to 17.1 for February. By ages there were 523 deaths of infants under 1 year of age, 201 deaths of children aged 1 to 4 years, and 1,158 deaths of elderly persons, 65 years of age and over. The principal increase of the month was for the latter class.

Important causes of death were as follows: Tuberculosis of lungs, 189; typhoid fever, 42; diphtheria and croup, 57; scarlet

fever, 32; smallpox, 3; measles, 21; whooping-cough, 27; pneumonia, 487; influenza, 195; cancer, 128; accidents and violence, 175. Diphtheria was somewhat less prevalent than last month, while pneumonia and meningitis increased, the latter especially nearly doubling in amount.

MINNESOTA.—Minneapolis, 240,000. Report for January: Deaths, 216—46 under 5 years. Annual death rate, 9.9. Deaths from typhoid fever, 15; consumption, 25; cancer, 7; organic heart disease, 13; other diseases of the circulatory system, 9; bronchitis, 10; pneumonia and broncho-pneumonia, 26; Bright's disease, 10.

St. Paul, 185,000. Report for January: Deaths, 140—45 under 5 years; death rate, 9.07. Deaths from consumption, 14; pneumonia, 15; broncho-pneumonia, 5; typhoid fever, 2; scarlet fever, 3; cancer, 7.

MISSOURI.—St. Louis, 645,000. Report for January: Deaths, 1,008; annual death rate, 20.2. Deaths from zymotic diseases, 85; scarlatina, 13; diphtheria and croup, 11; typhoid fever, 19.

NEW JERSEY.—Hudson County (Jersey City and environs), 433,573. Report for January: Deaths, 759—204 under 5 years; death rate, 21.0. Deaths from croup, 8; diphtheria, 18; scarlet fever, 19; whooping-cough, 3; typhoid fever, 4; all zymotic diseases, 75; phthisis, 95; bronchitis, 27; pneumonia, 152; cancer, 28; violence, 43; still births, 63.

Newark, 272,000. Report for the week ended February 20: Deaths, 131—40 under 5 years; death rate, 25.04. Deaths from contagious and infectious diseases, 35; diphtheria, 5; scarlet fever 6; consumption, 16; pneumonia, 25; broncho-pneumonia, 6.

NORTH CAROLINA.—Bulletin of mortality for January summarizes reports of 27 towns, with aggregate population 159,000: white, 92,050; colored, 66,950; deaths, respectively, 93, 140: 233; death rates, 12.1, 25.1: 17.6. Deaths: from consumption, white, 10; colored, 18: 28; heart diseases, white, 9; colored, 12: 21; pneumonia, white, 20; colored, 24: 44.

OHIO.—Cleveland, 430,000. Report for January: Deaths, 544—154 under 5 years; annual death rate, 15.18. Deaths from typhoid fever, 12; diphtheria and croup, 17; tubercle of lungs, 52;

pneumonia, 76; broncho-pneumonia, 12; cancer, 17; heart diseases, 45; Bright's disease, 23; early infancy—congenital icterus, debility, etc.—32; senile debility, 22; still births, 36.

PENNSYLVANIA.—Philadelphia, 1,408,154. Report for week ended February 27: Deaths, 639—184 under 5 years; annual death rate, 25.59. Deaths from typhoid fever, 23; Bright's disease, 52; consumption, 80; diphtheria, 11; measles, 12; diseases of the heart, 50; nephritis, 44; pneumonia, 87; congestion of the lungs, 15; cancer, 30; *smallpox*, 12.

Pittsburg, 354,000. Report for the week ended March 5: Deaths, 164—47 under 5 years; annual death rate, 24.09. Deaths from diphtheria and croup, 2; whooping-cough, 1; typhoid fever, 14; tuberculosis, 10; pneumonia, 27; bronchitis, 6; cancer, 7.

PHILIPPINES.—Report of September, 1903: The diseases causing the greatest mortality, with the number of deaths from each during the month, among the resident population of Manila, were as follows: Convulsions of children and eclampsia, 394; Asiatic cholera, 232; pulmonary tuberculosis, 71; diarrhea and enteritis, 68; meningitis, 43; acute bronchitis, 42; dysentery, 39; chronic bronchitis, 38; beri-beri, 35; malarial fevers, 23; congenital debility, 21; typhoid fever, 15. There were but 3 deaths from plague and none from smallpox.

There were 290 cases of cholera, with 263 deaths, among both residents and transients in the city during the month, and the cause of this sudden rise well illustrates the many difficulties in the way of controlling a population not as yet generally brought to a realization of the importance of sanitary measures. The waters of the Pasig River and certain esteros were recognized as infected with cholera, and the cases previously occurring were largely among those who, in spite of warnings, persisted in using these waters for drinking, cooking and domestic purposes. In the first seven days of September there were 13 cases of cholera, or an average of slightly less than 2 cases daily. On September 7, however, a spring of relatively fresh water was discovered discharging into the salt waters of the bay on the Tondo Beach, below low-tide level, and situated but a few yards below the point of discharge of a large sewer. This appearance of fresh water among the salt was at once made much of by the superstitious and credulous. Various stories were told with regard to the discovery of the spring. Perhaps the one most widely believed was that a

sacred image was seen floating in the water where the spring was bubbling up, and on the attempt being made to pick it up, the image rose into the air and disappeared. It was widely reported among the lower classes that a miracle had occurred and that the spring waters were possessed of great curative powers, and as a consequence hundreds came to drink the waters and carry them home to their friends. The health authorities early appreciated the dangerous possibilities of the situation, but because of the strong quasi-religious aspect of the matter and pending examination into the character of the water, it was not practicable to close the spring immediately. The spring was, however, placed under quarantine on September 13th, there having occurred 120 cases of cholera in seven days. Analysis of the water showed it to have all the character of sewage, it apparently being derived from a break in the sewer discharging in the vicinity of the spring. In a very large proportion of the cases investigated, the persons attacked had drunk the water at the spring or had it brought to them by well-meaning friends for its supposed curative properties. Even after the spring was closed its evil effects were manifest for some time, as the cholera infection had been widely disseminated through the various districts of the city previously free from the disease. During the week following the closing of the spring the number of cases developing were reduced to 79, the next week to 64, and after that there was a steady return to normal. Not less than 225 cases of cholera directly occurred as the result of the discovery of this spring and the credulity and superstition of the lower classes. The better class of Filipinos largely escaped during this outbreak, and of the four Americans attacked three were known to have tempted infection by partaking of food and drink in an unsanitary native shop during the height of the outbreak. One difficulty in combating the cholera infection in this outbreak was found in the concealment of the cases in many instances, as shown by the fact that only 129 of the total cases were reported while alive, while 161 were dead when found.

A matter giving much concern to the health authorities was the appearance of a number of cases of bubonic plague in the city of Cebu, among the persons who had not been outside that municipality for some time and had apparently contracted the disease from a local infection. Investigation showed that one or two cases had occurred yearly since the infection was known to have been introduced in 1900. In all, 13 cases were reported in the city of Cebu during the month, of which 6 occurred in one day,

and of these 4 occurred in the same house. The infection appears to be confined to a very restricted district; from which the measures planned should ultimately be able to eradicate it. Every precaution is being taken to prevent the infection being transported to any other ports in the Archipelago.

PORTO RICO, 953,243.—Report for January: Deaths, 1,901—739 under 5 years; annual death rate, 23.9. Still births, 137; cerebrospinal fever, 14; diphtheria, 1; typhoid fever, 4; grippe, 14; pneumonia, 51; puerperal fever, 10; diarrheal diseases, 38; anæmia, 277; bronchitis, 94; heart diseases, 28; tuberculosis, 155; diseases of the nervous system, 22; accidents and violence, 10; undefined diseases, 1,002.

TENNESSEE.—Memphis, 130,000—59,000 colored. Report for January, 1904: Deaths, white, 111; colored, 126: 237. Annual rates per 1,000, residents only, white, 18.72; colored, 25.56: 21.84. Deaths from typhoid fever, 2; intermittent and malarial fevers, 2; smallpox, 2 (colored); grippe, 5; tubercle of lungs, 4 white, 15 colored; pneumonia, 19 white, 40 colored; Bright's disease, 15 white, 2 colored; cancer, 1 white. Report for the year 1902: Deaths, 865 white, 1,094 colored—a decrease of 17 white, and an increase of 50 colored; total increase of 33, with an increase of population of 10,000. Death rates, white, inclusive of non-residents, 13.10; colored, inclusive of non-residents, 20.25, or a total death rate for the year of 16.32, a decrease, as compared with 1901, of nearly 7 per cent. The death rate among the resident population was, white, 9.64; colored, 16.72, or a total death rate for residents only, 12.82. Of contagious diseases: diphtheria, 70 cases, with 8 deaths; scarlet fever, 149 cases, 11 deaths; typhoid fever, number of cases not reported, 34 deaths—10 less than in 1901. "Tuberculosis was the cause of over 15 per cent. of the total deaths during the year, and this, with the known fact that it is a preventable disease." Deaths from measles, 2; whooping-cough, 10; smallpox, 258 cases, a reduction of 40 per cent. as compared with the previous year. Of the total number, only 12 had ever been successfully vaccinated, and of these 12, none had been vaccinated within ten years.

UTAH.—Salt Lake City, 75,000. Report for February, 1904: Deaths, 111—39 under 5 years; annual death rate, 17.36. Deaths from typhoid fever, 1; whooping-cough, 2; diphtheria, 3; septi-

cemia, 3; tubercle of lungs, 9; pneumonia, 15; broncho-pneumonia, 5; acute bronchitis, 6; organic diseases of the heart, 8 Bright's disease, 5; senile debility, 9; cancer, 1.

VERMONT.—Bulletin for March (quarterly). Disinfectants and Disinfection, by Hibbert W. Hill, M.D.; Sewage Disposal, by X. H. Goodenough, and the Legal Use of Laboratory, by M — J. Wiltse. Excellent practical summaries of the several subjects, followed by Vermont Laws Relating to the Registration of Vital Statistics, by H. L. Stillson, Health Officer of Bennington, and discussion. The Signification of Chlorine and the Practical Use of a Normal Chlorine Map, by C. P. Moat, Chemist, is an important contribution to the study of water pollution in sea-coast regions.

WASHINGTON.—Seattle, 135,000. Report for February: Deaths, 90—27 under 5 years; annual death rate, 7.92. Deaths from tuberculosis, 13; typhoid fever, 2; diphtheria, 2; organic heart diseases, 14; Bright's disease, 5; pneumonia, 7.

WISCONSIN.—Milwaukee, 315,000. Report for January: Deaths, 368—141 under 5 years; annual death rate, 13.32. Deaths from typhoid fever, 7; diphtheria, 11; phthisis, 33; pneumonia and broncho-pneumonia, 49; bronchitis, 20; cancer, 16; organic heart disease, 18; nephritis, 9; congenital debility, 20; senile debility, 18; violence, 11.

Report of the State Board of Health for 1901-1902. A volume of 300 pages. It comprehends the history of smallpox in the State for the period, and urges more stringent laws for its prevention by vaccination. Recommends the establishment of a State sanatorium for the care and treatment of consumptives. Gives the history of the epidemic of typhoid fever at Baraboo, in 1901; urges attention to it as commendable for the prevention of similar outbreaks. Sums up the analyses of the drinking water of a number of localities, and gives the results. The Secretary reports an abstract of the minutes of the meetings of the Board and the gist of correspondence with local health officers on the various phases of the practical work for the suppression of smallpox and other infectious diseases. The number of organized local boards in the State, at the time of submitting this report, was 1,348. "In many places, however, the health officer, who is the executive officer of the board under the law, receives no salary or

compensation for his labors." The legislature is urged to make it mandatory, on the part of the local authorities, to provide a reasonable compensation for health officers.

ON THE RETIREMENT OF DR. W. O. B. WINGATE, as Secretary of the State Board of Health, as announced in our March number, the "Wisconsin Medical Journal" for February says that it "must be looked upon by the medical profession as a distinct loss to the State and a menace to the efficiency of the Board. There are, of course, other men in the State who may become competent to fill the position of Secretary of the State Board of Health, but they are not made in a day, and it is not at all probable that any man who takes up the work without long experience will render as efficient services as Dr. Wingate has given. Dr. Wingate is recognized throughout the whole country as a most excellent sanitarian, and as an authority on this subject. He had brought the State Board of Health to a high state of efficiency and retires with the respect and entire confidence of the medical profession.

"Dr. Wingate's retirement is not in the interest of the people or the public health, nor is it due to any lack of fitness; political reasons only have dictated it. In the language of one of the political members of the State Board of Health—'this plum should be passed around.'

"We know whereof we speak when we say that the method of this retirement is discreditable to those members of the State Board of Health who manipulated the deal, discreditable to the State administration, and unwarranted by Dr. Wingate's long and efficient conduct of the office.

"The public health is too vital a matter to be subjected to the vicissitudes of politics.

"The position of Secretary of the State Board should be occupied by a recognized sanitarian, who should hold office so long as his professional fitness is unquestioned; lack of fitness of the incumbent should be the only reason for a change.

"As physicians we earnestly protest against the mixture of politics with public health. If the politicians of this State were to grasp the force of these facts and were to consult the best interests of the people, we should not again be treated to the spectacle of the underhanded removal of a thoroughly competent medical officer at the period of his greatest usefulness, and for the stupid reason that the 'plum should be passed around.' We understand that Dr. Wingate contemplates retiring altogether

from the Board, and we voice the sentiments of hundreds of physicians when we express the hope that he may remain and continue to give the people the benefit of his ripe experience in public hygiene. This action may not be appreciated by the hungry horde of political plum pickers, but it will be appreciated by the medical profession and the intelligent public."

ONTARIO.—DR. PETER H. BRYCE, who has for many years filled the office of Secretary of the Provincial Board of Health, with great acceptance to the Ontario medical profession, has resigned, and has entered the service of the Federal Government, at Ottawa, as Medical Inspector of Immigration. He will have charge of all medical officers of ports of entry, and, in addition, will supervise the medical arrangements for Indians. His successor in the Ontario Board of Health is Dr. Charles A. Hodgetts, who has been connected with the board for a number of years, having been appointed, in 1900, to the position of Chief Medical Inspector for the Province. Dr. Hodgetts will discharge the duties of both offices, and, in addition, will act as Registrar-General of Vital Statistics.

CUBA.—Havana. Chief Sanitary Officer's report for November, 1903: Total mortality in the District of Havana, 456, two less than in October, but 38 more than in November, 1902. Annual death rate, 21.14.

The increase (38) as compared with the number in November of last year is more than accounted for by the 45 deaths from scarlatina in the present report, while no deaths from that cause figured last year in the corresponding monthly report. That our efforts have not been crowned with immediate results, agrees with the general experience that in dealing with epidemics of this disease, it always requires some months to elapse before it can be brought under control. Now, however, the epidemic is certainly on the wane, for, at the date in which this letter is being written, the number of cases on hand has dropped to 383, with no deaths during the last eight days, while on November 24th there were 576 on hand.

The deaths in Havana as compared with the preceding thirty days have increased only in the groups of diseases of the circulatory apparatus (+ 5), respiratory apparatus (+ 6), early infancy (+ 4), old age (+ 4), external causes (+ 6), showing a decrease in every other group. The deaths among children un-

der 5 years of age have numbered 139, against 112 in the previous thirty days, and 114 in November, 1902. There have been 4 deaths from tetanus neonatorum, against 6 in the preceding month, and 8 in November of last year.

The deaths from tuberculosis have numbered 86, against 77 in October, and the same figure in November of last year.

No case of smallpox, but two imported ones of yellow fever have been recorded in this month of November. Both came on the S. S. "Paloma" from Guanta and La Guayra (Venezuela) on the 8th; one of them died on the day of arrival, the other was discharged cured on the 30th.

The reports from the other districts of the Island are favorable. Sixty-four of the eighty-two municipalities have sent in their reports. They show a total of 1,660 deaths (including the district of Havana) for a population of 1,284,262, equivalent therefore to the annual type of 15.71 per 1,000, this figure being nearly the same as that for the preceding month.

CITY OF MEXICO, 368,777.—Bulletin of mortality for October, 1903: Typhus fever, 27; typhoid fever, 4; smallpox, 8; measles, 3; scarlatina, 5; whooping-cough, 10; diphtheria, 1; grippe, 2; tuberculosis, 149; syphilis, 10; cancer, 20; meningitis, 43; apoplexy, 29; heart diseases, 55; bronchitis, 54; broncho-pneumonia, 44; pneumonia, 57; congestion of the lungs, 9; diarrhea and enteritis, 302; cirrhosis of the liver, 63; hepatitis and abscess, 26; accidents, 23; alcoholism, 11; other causes, 336: 1,291. Annual death rate, 42.0.

RECENT SANITARY PATENTS.

744621.—Cuspidor; Moritz Rosenweig, Allegheny, Pa.

744766.—Fumigating Machine; Ernest Kimmich, Detroit, Mich.

745154.—Exercising Machine; Ferdinand H. Chlada, Ouray, Col.

745322.—Garbage Box; Thos. E. Burrough, Trenton, N. J.

747488.—Garbage Destructor; Thomas Rooke, Newtown, and John Thrush, Dulwich Hill, New South Wales, Australia.

747960.—Collapsible Protecting Device for Closet Seats; Isak Franken, Frankfort-on-the-Main, Germany.

749269.—Garbage Crematory; Louis F. Decarie, Montreal, Canada.

BOOK REVIEWS.

THE STORY OF NEW ZEALAND.—A history of New Zealar from the earliest times to the present, with special reference the Political, Industrial and Social Development of the Isla Commonwealth; including the Industrial Evolution dating fr 1870, the Political Revolution of 1890, the Causes and Con quences, and the General Movement of Events Throughout t Four Periods of New Zealand's History. 8vo. Pp. 860. N merous illustrations. By PROF. FRANK PARSONS, Ph.D., of t American Academy of Political and Social Science; Director the Department of History in the Bureau of Economic Researc Washington, D. C.; Member of the Boston Bar, and for twel years past a lecturer in the Boston University School of Law Author of "The City for the People," "The World's Best Books, "Great Monuments of the Century," "The Power of the Ideal, etc. Price, $3.00, net. Edited and published by C. F. TAYLOR M.D., 1520 Chestnut street, Philadelphia.

This volume is unique in the literature of the world. It i history, biography, psychology and sociology welded into on lighted with art and humor, charming as the unfolding of a power ful drama, forceful as clear and vigorous English can make i Rarely ever before has the political, industrial and social histor of a people been gathered into one richly illustrated and delightfu volume. Never has a writer had a subject more full of hop for the solution of the most pressing problems of this age. No has the relation between successive increments of popular contr over the government and the improvement of industrial condi tions been more clearly marked. Never has the curve of prog ress taken an upward sweep so like the path of a rocket.—"Fro savage cannibalism to the highest civilization in a life time, fro one of the poorest countries in the world to the richest (pe capita) in half a century, from racial war to racial harmony in generation, from industrial war to industrial peace in a decad from charity to justice, competition to co-operation, monopoly t diffusion, despotism to democracy; government by landlords an the money power in their own interest to government by farmer and workingmen in the interest of all as the outcome of a grea election, is certainly a record of change in condition and policy which for quantity, quality and speed of progress is without parallel."

The Story of New Zealand hinges on scientific colonization with selected immigration in the forties; the public works policy of 1870, that established a national railway system and laid the foundations of the material development of the Commonwealth; the improvement of the electoral system in the eighties; the momentous "Industrio-Political Revolution of 1890, when the common people united at the ballot box to elect men pledged to their interest, swept the monopolists out of power and obtained control of the Government; and the consequent institutional reforms of subsequent years, especially 1891-4, '96, '98, and 1901, by means of which New Zealand has made more progress toward industrial freedom than any other country in the world."

The results of the American Revolution or of the French Revolution were not more remarkable or far-reaching than the consequences of this peaceful revolution by the ballot in the far-away home of the Yankees of the South Pacific. It turned the tide from the concentration of wealth to its diffusion, changed the fundamental control from government by and for the monopolists to government by and for the people, and set in motion motives and forces that have already solved some of the most difficult industrial problems of the age and are moving steadily forward to the solution of them all.

A copious index, excellent table of contents, illustrations and valuable hints in the preface enable the reader to find at once any matter he desires to refer to and the cross references bearing upon it in all parts of the volume; and from the "Information Bureau" (p. xxiii) "the traveler through the book may obtain answers free of charge to a number of special questions" that may occur to him in reading the narrative.

A PRACTICAL TREATISE ON NERVOUS DISEASES FOR THE MEDICAL STUDENT AND GENERAL PRACTITIONER.—By F. SAVARY PEARCE, M.D., Professor of Nervous and Mental Diseases in the Medico-Chirurgical College of Philadelphia; Fellow of the College of Physicians, Philadelphia; Neurologist to the Philadelphia and Howard Hospitals; Member of the American Psychological Association, and of the American Climatological Association; Chairman of the Section on Nervous and Mental Diseases of the American Medical Association. Colored frontispiece; 91 illustrations in the text, many in colors. 8vo. Pp. 422. New York and London: D. APPLETON & Co.

This text-book of practical neurology is written with the in tent, and admirably fulfils its purpose, to fill a distinct niche i the literature of the subject of which it treats. The work ir side of nervous diseases (as to etiology and therapeutics) is e pecially dwelt upon, believing that treatment is the least und e stood by students and general practitioners. The chapter o anatomy and physiology, with which the volume opens, so ble d and unifies these subjects as to facilitate and insure a pretty cl ar understanding of the anatomy and functions of the various pa rts of the nervous system as the essential foundation for the s uc- ceeding chapters on general pathology, general symptoms and methods of examination, general therapeutics, and prevention of nervous diseases, etc.; diseases in detail, and their treatment. It thoroughly comprehends the gist of the best literature on the subject, fortified by the author's own experience, and is, altogether, commendable to both students and practitioners.

THE AMERICAN YEAR-BOOK OF MEDICINE AND SURGERY FOR 1904.—A Yearly Digest of Scientific Progress and Authoritative Opinion in all branches of Medicine and Surgery, drawn from journals, monographs and text-books of the leading American and foreign authors and investigators. Arranged, with critical editorial comments, by eminent American specialists, under the editorial charge of GEORGE M. GOULD, A.M., M.D. In two volumes. Volume I, including *General Medicine.* Octavo, 673 pp., fully illustrated. Volume II, *General Surgery.* Octavo, 680 pp., fully illustrated. Philadelphia, New York, London: W. B. SAUNDERS & Co., 1904. Per volume: Cloth, $3.00, net; Half Morocco, $3.75, net.

Volume I.—*Medicine.*—This volume continues to maintain its high place among works of its class. Indeed, the issue of 1904, now before us, if anything, is even better than the excellent issues of previous years. Such a distinguished corps of collaborators as the editor, Dr. George M. Gould, has enlisted as his assistants is sufficient guarantee that the essential points of progress are brought out, and the collaborators' notes and commentations are excellent. In the illustrative feature the 1904 issue fully maintains its reputation, there being fourteen full-page insert plates, beside a number of excellent text-cuts. It is beyond question one of the best of medical annuals, eminently useful to all physicians who would keep abreast with medical progress.

PROGRESSIVE MEDICINE, Volume I, March, 1904, appears in changed form, paper cover, and at a reduced price. As to contents, however, it fully maintains its established excellence. The scope of the present volume includes extensive essays on such important and essentially progressive subjects as cerebral pressure, heart surgery, the treatment of tic douloureux, exophthalmic goitre, the transmission of diseases by insects, the theories as to the etiology of rheumatism, tetanus, paratyphoid, modern views on the nature of hay fever, etc., in which the latest work of foreign and domestic observers is fully discussed.

Considered from every point of view, that of authoritativeness, completeness, adaptation to practical needs, agreeable style, availability for reference, convenient form, satisfactory presswork, telling illustrations, the work is one that the medical profession may well be proud and grateful to possess.

A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by HOBART AMORY HARE, M.D., Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia. $6.00 per annum. LEA BROS. & Co., Philadelphia and New York.

REPORT OF THE COMMISSIONER OF EDUCATION FOR THE YEAR 1902. Volume II. Pp. 1271.

This volume comprehends reports on Education in Porto Rico and Alaska; the Introduction of Domestic Reindeer into Alaska; Universities, Colleges and Technicological Schools; Professional Schools; Agricultural and Mechanical Colleges; Statistics of Normal Schools; Statistics of Secondary Schools; Manual and Industrial Training; Commercial and Business Schools; Schools for Nurses; Education of the Colored Race; Statistics of Reform Schools; Schools for the Defective Classes; Statistics of Defective Sight and Hearing in the Public Schools; Education of the Feeble-Minded in the United States; Changes in the Age of College Graduation; Education in the Philippines; Statistics of the Public and Private Kindergartens; Illiteracy in the United States; Current Topics, and an Elaborate Index. Altogether (Vol. I, reviewed in February number) the most resourceful fund of knowledge on the most material subject of interest to every American citizen that emanates from the Government Printing Office.

WEATHER FOLK-LORE AND LOCAL WEATHER SIGNS.—By EDWARD B. GARRIOTT.—Prepared under the direction of Willis L.

Moore, Chief of U. S. Weather Bureau, U. S. Department of Agriculture. 8vo. Pp. 152, and twenty-one charts. Government Printing Office, Washington, D. C.

An interesting historical sketch of the study of the weather, and a particularly commendable introduction to a practical knowledge of it on a scientific basis.

CLIMATOLOGY OF CALIFORNIA.—By ALEXANDER G. McADIE, Professor of Meteorology. Prepared under the direction of Willis L. Moore, Chief of U. S. Weather Bureau, U. S. Department of Agriculture. 4to. Pp. 277.

This volume, for the most part, consists of weather charts, diagrams and statistical tables. Gives a lucid description, however, of the general climatic conditions and their factors depending upon the various conditions of diversified topography, exposure to oceanic currents and season. Pressure, wind and rainfalls are elaborately illustrated, differentiated and tabulated for the different regions and important localities throughout the State.

ANNUAL REPORT OF THE SURGEON-GENERAL OF THE PUBLIC HEALTH AND MARINE HOSPITAL SERVICE OF THE UNITED STATES FOR THE FISCAL YEAR 1902.—Pp. 487. Washington: Government Printing Office.

At the close of the fiscal year the personnel of the service consisted of the surgeon-general and 104 commissioned officers: 29 surgeons, 27 passed assistant surgeons and 48 assistant surgeons. There were 181 acting assistant surgeons, 2 sanitary inspectors, 46 pharmacists, and 539 hospital and quarantine attendants.

The Service controls and operates 23 hospitals, of which 21 are owned by the United States, and 2 are leased buildings. Besides these are 120 relief stations, where seamen receive hospital and dispensary treatment.

During the year 56,310 sick and disabled seamen of the merchant marine were treated, of which number, 12,927 were treated in hospital. Two hundred and twelve patients were treated for tuberculosis during the year at the Sanatorium for Consumptives at Fort Stanton, N. Mex. Besides, during the year, the Service has extended aid to other branches of the Government, as follows: To the Revenue Cutter Service in the physical examination of 800 applicants for enlistment; examination as to physical capacity of 1,759 pilots; physical examination of 1,045 surfmen for the Life Saving Service; medical inspection of 746,297 immigrants, and

physical examination of 27 applicants for enlistment in the Coast and Geodetic Survey and Lighthouse Service. At the National Quarantine Stations 5,828 vessels were inspected. Reports of infectious diseases, at home and abroad, are summarized.

Report of work of the Yellow Fever Institute, and of the Hygienic Laboratory, and abstract of the proceedings of the Sanitary Convention of American Republics follow.

Next follows the law changing the name of the Marine Hospital Service, designating it as the Public Health and Marine Hospital Service of the United States, and defining its duties.

Next follows the report of the work in detail for the year, comprehending statistics of hospitals, relief stations, meteorological records, mortality and morbidity, special details of fatal cases, with necropsies; quarantine stations, home and foreign. Illustrations of tent villages for consumptives; boxed and heated tents for winter; exercises of, and farming by the consumptives at Fort Stanton Sanatorium, and several illustrations of the quarantine stations and works, add interest to the report, which, on the whole, is creditable to the Service, and ought to satisfy and silence the still lingering contention for an eminently competent national health service. They have it.

CONTEMPORARY LITERATURE.

THE FUNCTION OF SELECTION.

By denying that selection has any power to initiate or actuate developmental changes it is not intended to imply that it has not profoundly influenced the course of evolution in many organic groups. Indeed, it may be claimed that the kinetic theory of evolution affords the first concrete explanation of the workings of natural selection. Vital motion not only makes select influences possible, but it meets the ancient and hitherto fatal objection to the theory of selection, since it shows how characters may originate and develop to the point of utility or harmfulness, when selection can take effect.

The hypothesis of selection as the active principle or causal agency of evolution became illogical and useless as soon as the inheritance of acquired characters was abandoned. The first idea without the second does not account for adaptations. The selection of Nägeli, Weismann, and other believers in a "determining

principle" or "hereditary mechanism" of evolution is a very weak substitute for the Darwinian idea, able only to eliminate the hopelessly unfit, but quite without means of influencing their survivors. The recognition of a continuous and necessary vital motion permits us to understand that the rejection of the environment of a harmful variation encourages adaptation by accelerating the development of any more adaptation which may appear.

All organisms are subject to selective influence, in the sense that variations are rejected with a promptness proportional to their harmfulness in the given environment, but generally this leaves a very wide latitude of possible dangers in which selection does not interfere. The instances are relatively rare in which existence becomes actually dependent upon the development of some one characteristic or quality, and such narrow selection does not strengthen the type, but insures and even hastens its extinction.—From "Evolution Not the Origin of Species," by O. F. Cook, "Popular Science Monthly" for March.

INTERNATIONAL COPYRIGHT.

The passage of a law by Congress to prevent the pirating of literary and art productions exhibited by foreigners at the St. Louis Exposition, made a good impression here [in Germany], and corresponds with the expressed wish of Germans interested in those lines. There was considerable agitation of the matter when many manufacturers of art prints refused to exhibit at St. Louis on the ground that they had no protection from virtual theft. While the enactment of the law, therefore, has been received with satisfaction, the latter is tempered by the consideration that Congress only acted as an afterthought, in order to promote the material success of the Exposition, while ignoring the abiding equities in the matter. In this connection the German press has indulged in some rather bitter comment upon the general subject of copyright conditions in the United States. German laws, it is complained, give the American author and artist absolute protection from piracy, while our copyright law requires the manufacture of books and art prints in the United States before guaranteeing protection. It is a standing source of irritation among German writers that their stories are habitually reprinted by German newspapers in America, without their having any way of securing redress; and newspaper editors, given to plainness of speech, hold us up to contempt as "a State with legally authorized

robbery of intellectual property."—William C. Dreher, in the March "Atlantic."

A WIND-CALL.

Dust thou art, and unto dust,
Playfellow, return thou must;
Lingering death it is to stay
In the prison-house of clay—
Bricks of Egypt year by year
Walling up a sepulchre.

Better far the soul to free
From its close captivity,
And with us, thy comrades, go
Whereso'er we list to blow.
Come! for soon again to dust,
Playfellow, return thou must.
—John B. Tabb, in the March "Atlantic."

UTILIZING VACANT CITY LOTS.

In the April "Delineator" Allan Sutherland writes of a remarkable sociological experiment—no longer an experiment, for its practical value has been demonstrated—that has been tried in several large cities, of changing unbeautiful vacant lots into garden spots. Vacant tracts of land are borrowed from generous owners of real estate, divided into small tracts and loaned to needy people, chiefly old men, invalids and children. They are furnished with seed, tools, etc., and their work is directed by competent supervisors. Among the many beneficent results of the efforts of the Vacant Lots Association, the following are mentioned in the article: Hundreds have found employment who would otherwise have been idle; land has been rescued from weeds and rubbish and made to bring forth fruits and flowers; little children who at best could hope only for a "country week" have found a glorious "country summer"; they have had, in large measure at least, suggestions of country life, with its blessings of pure air, wholesome food and health-giving exercise, and many have already set their faces resolutely to look for pleasant homes in the country; indeed, the demand from suburban property owners is rapidly increasing for these youthful, trained workers of the soil.

OF INTEREST IN THE KITCHEN.—An article in the April "Delineator," on serving the formal luncheon and dinner, contains many practical suggestions, and is illustrated effectively. Dainty Dishes for Easter, illustrated, is of seasonable interest. Luncheon Dishes and Entrées from Left-overs will prove a valuable aid to economy, and Delaware Hot Breads seem tempting enough to dispose of even the objections of cold bread advocates. Delicious Sweet Fritters and Novel Oyster Recipes are other culinary topics.

ABOUT PROCTOR'S.

One of the regular patrons of Mr. Proctor's Fifth Avenue Theater expressed wonder the other day that a theater where such a small admission is charged could profitably offer its guests so many more conveniences than the Broadway theatres, where an admission of two dollars is asked. As a matter of fact, the exquisite courtesy which greets a Proctor patron, from his entrance in the lobby to his departure from the house, is one of the reasons of Mr. Proctor's success. Whether the visitor is seated in the upper gallery or in the box seats, there is every provision made for comfort and convenience in the shape of retiring rooms, writing rooms, smoking rooms, public telephones, and even public waiting rooms, where it is not required that the guest shall be a patron of the house. There are no theaters in the country where greater care is exercised in every detail looking toward comfort than the houses under Mr. Proctor's management, and his long career as an amusement caterer has enabled him to anticipate the every wish of his clientele.

Although Lent is supposed to have a depressing influence upon theatricals, there seems not to have been any appreciable decrease in the attendance at the Proctor houses, where the uniformly excellent shows compel generous patronage. At the same time special preparations are already being made for the Easter holidays, and while Mr. Proctor has made ample provision for the entertainment of the children who attend in augmented numbers during that period, these added attractions will not interfere with the interest of the regular bill, being acceptable to the adult as well as to the juveniles in the audience. One of the secrets of Mr. Proctor's success has been his careful catering to the period, and he never fails to give special recognition to the children in those intervals in the school year which mark certain festal seasons.

THE SANITARIAN.

MAY, 1904.

NUMBER 414.

THE MARYLAND TUBERCULOSIS EXPOSITION.

HELD UNDER THE AUSPICES OF THE TUBERCULOSIS COMMISSION OF MARYLAND, IN BALTIMORE, FOR THE WEEK COMMENCING JANUARY 25, 1904.*

BY DR. JOHN N. HURTY, Indianapolis, Secretary of the Indiana State Board of Health.

One year ago, the Maryland Legislature passed a law appropriating $2,000 to pay the expenses of investigating tuberculosis in the State of Maryland. A commission of six was appointed with Dr. Wm. S. Thayer as President, and Mr. John M. Glenn, Secretary. The duty of this commission was to make a report concerning tuberculosis in the State of Maryland, and append to it any recommendations which might be proper. This Tuberculosis Commission immediately associated itself with the Maryland State Board of Health and the Maryland Public Health Association. It was finally decided to hold a tuberculosis exposition, which, as said, opened January 25th for one week.

This exposition was entitled "An Objective Presentation to the People of Maryland of the History, Distribution, Varieties, Causes, Cost, Prevention and Cure of Tuberculosis." The program was carried out exactly. On Monday evening, the 25th, the exposition opened in McCoy Hall of Johns Hopkins University. This hall has a seating capacity of 1,200. Every seat was occupied, and the standing room in the rear was entirely taken up. It is estimated that probably 200 people were turned away.

Dr. Thayer first introduced Governor Warfield, who evidently had informed himself thoroughly upon the importance of combating the public enemy, known as tuberculosis. He expressed himself as favoring any reasonable measure which could be advanced, having for its object the suppression of tuberculosis,

*"Indianapolis Medical Journal" for February, 1904.

spreading destruction on every hand. Mayor McClain was also evidently well informed in regard to the importance of fighting the common enemy, for he, too, declared that he would gladly support any reasonable measure which might be proposed.

A notable speech was made by Dr. Osler, who described in vivid terms the horrors of tuberculosis and its awful destruction. He said, however, that a worse disease existed in Baltimore and Maryland, and it also prevailed throughout the United States. This disease was apathy. Until apathy could be overcome, it would be impossible to fight the monster, consumption. Mr. Frederick Hoffman, of Newark, N. J., the well-known insurance statistician, closed the evening with an address, entitled, "The Statistical Laws of Tuberculosis." At the close of this meeting the exposition was formally opened.

Upon entering the hall, the first thing to direct attention was a "Fisher Tent," invented by Professor Fisher, Professor of Political Economy at Yale University. This gentleman had acquired tuberculosis, and cured himself by outdoor life. He devised several tents, improved them from time to time, and now has a perfect invention. There is no patent on the tent and any one is free to construct it. A fine collection of old publications upon tuberculosis, dating back to the views of Hippocrates, the father of medicine, and some valuable old engravings of famous investigators of the disease, were on exhibition. These books and portraits belong to Dr. Wm. Osler, Dr. H. Barton Jacobs, Dr. D. R. Lyman and Dr. Lewis V. Hamman. There were over 100 volumes in all. Among them was "The Pathology of Phthisis," by Anderson, who was the first to give a correct description of the pathology of tubercle. Still another work was by Laennec. Laennec's own stethoscope, now owned by Dr. Osler, was on exhibition.

Many of the American and European sanatoria were exhibited. This was accomplished by photographs, elevations of buildings, plans of grounds, charts, maps and diagrams. A most striking sanatorium was the one established and maintained by the Invalidity Insurance Company, of Germany, this company finding it more profitable to cure consumptive patients at its own expense than to pay their life insurance.

We may especially mention the Adirondack Sanatorium at Saranac Lake, New York, under the superintendency of the well-known Dr. Trudeau. Dr. Trudeau, when a young man, smitten with tuberculosis, read an article, by the famous Brehmer, upon the outdoor treatment of consumption. He found his way to

aranac Lake, a point forty-two miles from any railroad. Here
e lived out of doors for one whole winter and recovered his
ealth. He graduated in medicine, and with the help of Dr.
oomis, of New York, established the now famous Saranac Lake
anatorium, which is a property valued at $350,000. Dr. Tru-
eau has not made one cent for his own pocket out of this, but
as given the work of thirty years for the humanitarian purpose
f saving human life from tuberculosis. Such knowledge, per-
stence, intelligence and tact as is possessed by this man, would
ave made him a captain of industry had he chosen to devote
is life to self rather than to the benefit of others.

The Muskoka Sanatorium, at Gravenhurst, Canada, was repre-
nted by Dr. J. H. Elliott, Superintendent. Everything ex-
ibited had been made by patients. The exhibits consisted of
odels of shingle-roof tents for outdoor life, photographs, plans,
pewritten bills of fare, and a book full of names of patients who
ad studied the rich flora of the region in the spring time, cata-
guing the flowers and plants they found. The sanatorium is
tuated at the southeast end of Muskoka Lake, a body of water
0 miles long and 10 wide.

The Millett Sanatorium, at East Bridgewater, Mass., was rep-
sented by its founder, Dr. Millett. He exhibited a model of
e frame sleeping-shack which bears his name. This shack must
ways face to the south, and is entirely open on that side. It is
ised six feet above the ground, has windows on the side and in
e rear, thus furnishing absolutely perfect ventilation. Indeed,
e person who sleeps in this shack virtually sleeps out of doors.

The Sanatorium at Oderburg, Germany, was represented by
notographs, plans and statistics. One of the largest exhibits was
ade by the Massachusetts State Sanatorium, Dr. W. E. Marck-
y, Superintendent. As we know, this is the only State Sana-
rium for consumptives in existence, but the one in Rhode Island
rapidly approaching completion. Stony Wold Sanatorium, at
ushaqua Lake, N. Y.; the Hospital for Diseases of Lungs, Chest-
ut Hill, Philadelphia; White Haven Sanatorium, Connecticut;
e Bedford Sanatorium for Consumptives, Westchester County,
ew York, were all represented.

The tuberculosis statistics for the last ten years of Michigan
d Minnesota were exhibited in attractive popular form. The
berculosis statistics of Indiana for the last four years, the entire
riod of collection of the same, were exhibited by graphic charts.
the Baltimore exhibit were photographs of houses where tuber-

culosis had prevailed for a number of years, giving exact facts in regard to the same, thus bringing forward prominently the truth that houses must be disinfected in which this disease occurs if the combat against it is to be successful. Photographs of tenements and sweatshops were also presented, together with statistics and plans and specifications of the proposed Maryland State Hospital. It will be noticed that the name proposed does not contain the word consumption, this being left out on purpose, as is also the case in Massachusetts. Rhode Island will also simply call her institution, "The State Hospital."

The Loomis Sanatorium presented some interesting features which the other institutions omitted. One was the classification, which was as follows:

1. Early cases, with mild symptoms.
2. Early cases, with severe symptoms.
3. Advanced cases, with favorable symptoms.
4. Advanced cases, with unfavorable symptoms.
5. Long-standing cases, fibrosis predominating.
6. Long-standing cases, ulceration predominating.

The classification of discharged patients was as follows:

1. Apparently cured.
2. Disease arrested.

A large placard on the wall, signed by Osler, was headed:

"How shall we combat bad sanitary conditions in homes?"

This question was answered:

1. By an educational campaign in the homes carried out by the Board of Health and a staff of trained visitors.
2. By compulsory notification.
3. By enlarging the powers of health boards so as to deal efficiently with the question of disinfection.
4. By attention to housing of the poor, proper control of tenements, and regulation as to number of persons in each room.
5. All vacated homes to be made sanitary before reoccupation.
6. By condemning all that are unsanitary.

Various mottoes were placed high upon the wall on canvas, and artistically painted. One was in rhyme, as follows:

"Whilst meagre phthisis gives a silent blow,
Her strokes are sure, but her advances slow;
No loud alarms, nor fierce assaults are shown,
She storms the fortress first, then takes the town.'

One exhibit was devoted to placards and bulletins prohibiting pitting as proscribed in the cities of New York, Boston, Omaha, Denver, and other places. Of these Boston seemed to outdo all ther cities with a placard two feet long. It read as follows:

"You are violating the law against spitting. You are subject o imprisonment or fine, or both." By order of the Board of Iealth.

"Sputistics." This was the title under which Dr. Fulton, Secetary of the Maryland Board of Health, gave certain counts of putum defacements around the City Hall. In these statistics rdinary tobacco spits were not counted; only those that had the orbidding appearance which resembles the consumptive sputum. Bacteriological examination disclosed the tubercle bacilli in 5 per cent. The counts ran into thousands, and were presented in a most interesting way.

On Tuesday evening, Dr. Lawrence F. Flick, of Philadelphia, Superintendent of the Henry Phipps Institute for the Investigation, Cure and Prevention of Tuberculosis, delivered an address, entitled, "House Infection of Tuberculosis," which follows. On the stage was Henry Phipps, the multi-millionaire, who had made the institute possible. He will give in all five million dollars for this institute. Five hundred thousand are immediately available. Other gentlemen upon the stage were Drs. Welch, Osler, Jacobs, Abel, Ravenel, Salmon, Potter, and President Remsen, of Johns Hopkins University; Richet, Klebs, Babcock, Bowditch and Kinyoun.

The address of Dr. Flick was delivered at 5 p. m. That evening, at a dinner given by Dr. Osler, Mr. Phipps presented the host a check for twenty thousand dollars, without conditions, simply taking the word of Dr. Osler that it would be applied to outdoor consumptive patients, patients at the John Hopkins Hospital.

Wednesday evening two notable addresses were given. The first, by Dr. Ravenel, of Philadelphia, entitled, "Bovine Tuberculosis, a Factor in Human Tuberculosis." The second was by Dr. Salmon, "Some Observations on the Tuberculosis of Animals." The researches and publications of these two gentlemen have completely overthrown the contention of Dr. Koch, which he advanced in the International Tuberculosis Congress of 1901. Dr. Ravenel showed that even when infection takes place through the intestine, he first and oldest lesion shows in the lung, and in ten animals which he experimented upon, tubercle bacilli were found in eight, showing that the tubercle bacilli can pass through the perfectly

healthy intestine without leaving any trace or mark of its passage, and this takes place in a short space of time. "When we remember," said Dr. Ravenel, "that the chyle goes directly into the thoracic tract and is thrown into the circulation near the heart from which it passes to the lungs immediately, we can understand that infection from the intestine may readily show itself first in the lung." He showed a photograph of the remains of a guinea-pig inoculated with tuberculous material, which, says he, "I think justifies me in saying that tubercle bacilli pass through the intestines in large numbers." He said that he would strongly endorse the statement of Villemi that cattle perpetuate tuberculosis.

Dr. Salmon's article was carefully written and very conservative. He reviewed the classical experiments which he has conducted, and agreed with Ravenel that it is now positively proven that human beings may be infected with tuberculosis by drinking milk from animals infected with the disease and eating tuberculous flesh which is not thoroughly cooked. These two addresses were somewhat technical, yet the lay audience remained and heard them through with quiet and courteous interest.

A truly popular address was delivered by the famous Dr. Knopf, of New York, entitled, "Pulmonary Consumption, and the Possibility of Its Eradication Through the Combined Action of a Wise Government, Well-Trained Physicians, and an Intelligent People." Dr. Knopf evidently caught his audience, for they became very enthusiastic, and when he sat down he was made to appear on the stage several times and bow his acknowledgments.

On Friday evening, the address was by Dr. Geo. Adami, Professor of Pathology, McGill University, Montreal. His subject was: "Facts, Half-Truths, and the Truth About Tuberculosis." Dr. Welch introduced him as one of the most eminent pathologists of the world. This is certainly a high compliment, when we remember that Dr. Welch never uses extravagant language in expressing himself. Dr. Adami's lecture was of necessity somewhat technical. He made a brief historical review of the history of tuberculosis, to make possible a consideration of the principal theories which he wished to correlate and view in the light of the wonderful and almost iconoclastic discoveries of the last few years. He advanced rapidly through the half-truths of the older clinicians and led his audience up to the most important ideas about tuberculosis, but insisting that the truth itself was even yet to be devoutly wished for and seriously and laboriously worked for. "The unity of the tubercle bacillus throughout the animal king-

lom is one of the great themes in which medical men are engaged it present. To-day, so vast is the accumulation of facts that have been garnered in every department of human interest, that to keep abreast of all the advances being recorded in any large branch of science is a vain dream." Continuing, he said: "This is eminently true of medicine. We have reached with a vengeance the days of specialism, and so great is the out-pouring of facts and of new articles regarding even the one subject of tuberculosis, that it is impossible for any one to pose as an authority upon this subject, unless his whole time is devoted to it. I do not come to you as an authority upon tuberculosis. Indeed, but for the insistence of our friend, Dr. Osler, I would not be upon this platform. I have no new facts to bring before you, no record of personal observations that I am prepared to announce. I still remember the old warning of Hippocrates, a warning that appeals especially to medical men, coming as it does from the father of medicine himself, that 'experience is fallacious and judgment difficult.' I will try to point out how in the past, and in the very recent past, in this subject of tuberculosis, experience has proved fallacious; how during the last twenty years, conclusions which appeared to be absolute and sure, based upon exact observations, have been proved to be faulty, or at least imperfect; and now, therefore, it is the part of a wise man to have an open mind and to be prepared to find that which he had regarded as settled, may, through fuller knowledge, be found unsettled; to find we must weigh evidence with the greatest care and be most cautious in arriving at conclusions." . . . "Only a comparatively short time ago the infectious nature of tuberculosis was strenuously denied by most medical men. In 1880 and 1881, the communicability of the disease was being fought over at the meetings of medical associations."

The great achievement of establishing the fact of the communicability of tuberculosis Dr. Adami gave in some detail. He reviewed the fact that Behring is strongly of the opinion that the principal source of tuberculosis is the milk on which infants are fed. Dr. Adami used this as a potent argument for legislation about the proper inspection of cattle, for as Behring holds, there is greater liability for infection by bovine tuberculosis than by human. The speaker, however, expressed himself as inclined to believe that Behring's position on this point was somewhat insecure in that it is not now believed that bovine tubercle bacilli are any more readily implanted in the system than human bacilli. In passing, it may be remarked that Salmon and Ravenel agreed

heartily with Behring for, in general, as already related, the experiments of these gentlemen and recent studies by Theobald Smith plainly prove that bovine tubercular bacilli readily pass through the intestine without leaving a scar, appearing in the fluids of the thoracic duct, and readily producing lesions in the lung tissue. In illustration of the value of recognizing half-truths, Dr. Adami said: "But why, it may be asked, trouble so much about arriving at the exact truth? We admit that bovine tuberculosis is transmissible to man; that is sufficient, and once this is recognized, the duty of the government and of the people is obvious. What is more, all advances so far have been made by the recognition of half-truths, even in biology. No one will grant more freely than I do that if the legislation regarding bovine tuberculosis was based upon an imperfect conception regarding the relative frequency of the conveyance of the disease from cattle to man, that legislation has constituted a very distinct advance. From a purely commercial aspect, whatever be the result of this active controversy, it is the duty of the government, as well as a pecuniary advantage to the farmer, to see that tuberculosis be, if possible, eradicated from our herds, and present legislation might go much further toward accomplishing this end." In regard to full-truths, Dr. Adami said: "I use this term merely for convenience, confessing its inaccuracy, hoping in this connection it is fully understood. If half-truths are useful, and if we have to be in the main content with them, it is the duty of the man of science to seek ever after a nearer realization of the whole truth. He must not expect to attain it. The whole truth in anything mundane seems almost beyond our power. But if we cannot attain thereunto it is for the man of science to strive ever to approach near to it, to be dissatisfied with half-truths. He must neither accept them as adequate nor get into the habit of regarding them as fixed. His new facts lead to the demonstration of the imperfection of those half-truths. He must ever be prepared to modify his views. Facts are not truths; true in themselves, they may, if insufficient, or if they do not bear upon the factors concerned, lead away from the truth, and in medical problems so many factors are involved that the half-truth is ever to be guarded against."

The social features of the tuberculosis exposition were simply delightful. Dinners were given by Drs. Osler, Welch, Jacobs, Thayer and Fulton, and every night, after the lecture, a social gathering was held at one of the clubs. Those from abroad who

were specially invited, attended luncheons and teas in elegant homes, provided with art galleries and conservatories. Tea was served in halls where the pictures of Rubens and other great artists looked down upon the company, and where the statues of great sculptors furnished decoration, enlightenment and pleasure. In one instance, a dinner was given in a conservatory where bananas and oranges were growing, and where roses and orchids were in bloom, where spring prevailed, while outside the winter king ruled boisterously. It was, indeed, encouraging to know and fully realize that men who live amidst such surroundings had not lost the instinct of charity, and could leave them to add individual effort to pecuniary gifts, for the purpose of rescuing the poor and miserable from the grip of tuberculosis.

While not so directly connected with the topic, I may step aside to notice a delightful clinic at Johns Hopkins. Dr. Osler was the presiding spirit. Besides the students, all clothed in white gowns, there were present the well-known blind physician of Chicago, Dr. Babcock, also Drs. Klebs, Adami, Ravenel, Flick, Keene, Bracken, Richet, Elliott, Brown, and others. The amphitheater was constructed in accord with special ideas of Dr. Osler. On either side of a floor space, 30x15, were ranged in rows the students in attendance. A wheeled couch and a table, with an assistant and the speaker, occupied the open space. The first case was one of Bell's paralysis. No special features attended it, except the student who came forward and gave, in lucid and intelligent language, his observations upon the case. The next person introduced was a negro, 60 years or more of age, who was afflicted with tuberculosis, which was advanced. Dr. Babcock, the blind physician, was called upon to hold the clinic and show the class and the visitors present how he made his diagnosis. The man had been told not to cough, and not the slightest hint had been given as to the disease, but those who had their eyesight could plainly make out the trouble. Dr. Babcock asked two or three questions, passed his fingers rapidly over the face of the patient, then down over the chest and back, and immediately said, "This man has tuberculosis, well advanced." More than this, in passing his hands over the back, his delicate touch fell upon an artery which told him instantly that an aneurism existed. This had not been made out at this stage by the clinician in charge and the other physicians present. The blind doctor was heartily applauded for his achievement. Another clinic concerned the subject of "Intestinal Seeds." A bright young man was called forward to give

an account of his investigations and studies. He presented, in an ordinary pill-box, the seeds which had been taken from the patient. He had also neatly labeled and carefully prepared, seeds of all kinds of berries for comparison, and by this method had determined that the seeds in questions were from raspberries. The work of the student showed careful research and observation.

The perfect cleanliness which prevails in every department of the Johns Hopkins University was very noticeable. At surgical clinics the students were clothed in white gowns, and look as sharply as you might, not one spot could be found where spitting had occurred. In the anatomical department, of which Dr. Mohl is the head, although the tables of the dissecting-rooms were all filled with dissecting material, still not the faintest odor of decomposition could be detected. Only the faint odor of carbolic acid was discoverable. Here perfect order prevailed. There was conversation among the students, but it was not continuous, and only carried on in low tones, and never upon any other subject than the one they were studying. Here again, were white gowns, every warmth and perfect ventilation. Such perfect record-keeping as exists in this department it would be hard to find anywhere. Dr. Mohl was able, by his great catalogues, to trace any subject that had ever come into his department. Also the name of every student that had dissected that subject. His system was simply perfect, and would rival that of the accounts of any bank. All through the second and third years four half-days of each week are given to the students of anatomy. The student is marked upon his work, his deportment and his examinations. Professor Meyer, now Professor of Anatomy at the Indiana University, was an assistant in this department. Hence it was that Dr. Mohl was familiar with the recent proposition of President Bryan to have the first two years of a four years' medical course taught in the Indiana State University, and its rejection by the State Board of Medical Registration and Examination. Dr. Mohl evidently did not understand the situation, believing the profession of the State might have made a very grave error. He expressed himself as very glad to hear the other side of the matter, as construed by the State Board, and agreed that possibly an effort had been made on the part of the University to progress too rapidly without the necessary clinical advantages and the essential "medical atmosphere."

We were shown every step in the preparation of dissecting material. After thorough cleansing and washing out of the arteries

system by pressure, the body is injected with a fluid composed of 10 per cent. glycerine, 3 per cent. carbolic acid, 50 per cent. alcohol and 37 per cent. water. After this, it is placed in the same fluid for a period of one to two months, then carefully wrapped and put in cold storage. Bodies thus prepared are perfectly flexible, soft, and in fine condition for dissection after five years. A visit to the Department of Pharmacology interested me greatly. The head of this department, Dr. John J. Abel, has done an enormous amount of original research work in physiological chemistry. He was among the first, if not the first, to call attention to the products of the suprarenal gland. It is known that the name adrenalin has been given by a commercial firm to the arterial pressure-raising substance derived from the suprarenal glands. Dr. Abel prefers his term "epinephrin," and he has determined that the so-called adrenalin is really epinephrin-hydrate. We were shown many combination products of epinephrin. One of the most interesting was with gold, a beautiful yellow compound, the physiological value of which was not yet determined. The iron compound with epinephrin was decidedly interesting, because a few physiological experiments had indicated that it would be a very valuable addition to our materia medica. At the present time Dr. Abel is contending with Aldrich in regard to the ultimate composition of epinephrin. The difference between these gentlemen, at this time, consists of one atom of carbon. "This may seem a very small matter," said Dr. Abel, "but both formulas cannot be true, and we cannot remain satisfied until the truth is known."

In the general visit to the hospital, passing from ward to ward, and bed to bed, one is struck with the perfect business management of the Institution, as shown in all the records, in the perfect cleanliness and in the order and discipline of the attendants. The ventilation is perfect, yet despite this perfect ventilation, patients are placed in the open air as much as possible. Wide and long terraces reach from building to building, guarded on either side with iron railings. Upon these terraces everywhere are to be found patients suffering from all complaints. Of course, they are in their beds, well tucked in, and perfectly comfortable, but enjoying the outside air and the sunshine, if any exists. All diseases of the respiratory tract are treated in the open air as much as possible. Cases of influenza are found to improve much more rapidly in the open air and sunshine than when protected in the house. Dr. Millett, of the sanatorium at East Bridgewater, treats

pneumonia in the open air with the best results, but this treatment has not yet been adopted at Johns Hopkins. Cases of typhoid fever are very materially and plainly helped by open-air treatment.

In closing this report, I wish to impart the news, which every physician of Indianapolis will receive with delight, and that is, that both Dr. Welch and Dr. Osler have promised to come to Indianapolis this year to be part of the teaching corps which will instruct the next Indiana Health Officers' School. In any case one of these gentlemen will be present; their relations to the University render it extremely difficult for them to both be absent during the medical course of instruction.

THE STATISTICAL LAWS OF TUBERCULOSIS.*

By FREDERICK L. HOFFMAN, Actuary of the Prudential Life Insurance Company, Newark, N. J.

Tuberculosis causes annually more than 150,000 deaths in the United States at the average age of 35 years. At this age the normal after-lifetime is about thirty-two years, so that the real loss of life covered, measured in time, is represented by 4,800,000 years per annum. If we assume that the net value of a year of human life after age 35 is at least $50, the real loss to the nation resulting from the disease (a large proportion of which is known to be needless) may be estimated at $240,000,000 per annum. These astounding and almost incomprehensible figures are far from being an exaggeration, but let us assume that only one-half of this mortality is preventable, and we have a net possible saving to the nation of $120,000,000 per annum. This estimate does not take into account the social, moral and sentimental value of at least 100,000 lives, which, under different conditions, might reasonably hope to continue for many years. The mortality from tuberculosis is, therefore, a problem compared with which all other social problems of a medical character sink into insignificance, and it is safe to say that the possible prevention of a large

*Abstract of paper read at the Maryland Tuberculosis Exposition, January 25, 1904—From "Maryland Medical Journal," February, 1904.

portion of the mortality from this disease is justly deserving of the solicitude, the active personal interest and liberal pecuniary support of all who have the real welfare of the people of this nation at their heart.

Any attempt to deal successfully with the problem of tuberculosis prevention must needs proceed along the lines of a comprehensive statistical investigation, for the laws and tendencies of this disease are most intelligently expressed by statistical averages reduced to a uniform basis, readily susceptible of critical analysis. It is not necessary, however, nor perhaps advisable, in an address of this kind to make any extended use of statistics, for the concepts of the problem can be readily expressed in definite language, without superfluous ratios and percentages.

It is my purpose to deal briefly with the general facts of the tuberculosis problem, which, as far as I am able to judge, are necessary for a rational understanding of the methods and means best adapted to diminish the largely unnecessary mortality of this disease.

On the outset we are confronted with a fact which is generally ignored by those who would advance the cause of disease prevention by modern methods of ordinances and laws prohibiting spitting in public places, the segregation of tuberculosis patients, sanatoria treatment, etc., namely, the all-important truth that the *mortality from tuberculosis has progressively declined in American cities for more than half a century.* For illustration, in New York City the death rate from consumption per 10,000 of population was 42 during 1851-1860, against 39 during 1871-1880, and 27 during 1891-1900. In Boston the rate was 46 during 1851-1860, 41 during 1871-1880, and 26 during 1891-1900. For Baltimore we do not have the information previous to 1875, but we find that the rate decreased from 36 during 1876-1880, to 28 during 1886-1890, and to 21 during 1896-1900. (This includes the colored element.) The tendency toward a progressive decrease in the mortality from this disease from decade to decade during the past forty to sixty years has been practically the same in all of the principal American cities. In other words, the observed decrease in the mortality from tuberculosis antedates by many years the discovery of Professor Koch and the relatively recent view that the disease is of a highly infectious character and is transmitted from man to man.

It is necessary, then, for us to consider, first, the probable causes responsible for the decrease in the mortality from tuberculosis

without direct social measures or conscious efforts to produce this result. It is always hazardous to advance views for which we have no definite statistical basis of observed experience, but from a careful study of the available facts brought out in our social and industrial history, I have come to the general conclusion that *the decrease in the mortality from tuberculosis in past years,* or, let us say, previous to 1890, *must be ascribed primarily to a profound change for the better in the mode of life of the masses.* I would include in this term all the elements of social progress that can be determined or measured by the statistical method, and that can be confirmed by impartial medical and other investigations.

This general conclusion I find to include at least ten distinct or special factors, any one of which and all of which in conjunction with each other would seem to me to have been of sufficient importance to produce the phenomenon of a decreasing mortality from tuberculosis without direct social or legislative measures.

First.—We may attribute the decrease in the mortality from tuberculosis to vast and far-reaching improvements in the housing of the masses of the population in cities, of which formerly, say, forty or fifty years ago, a large proportion lived in cellar dwellings, in houses located on damp and unwholesome subsoil, or on areas filled in with garbage and other health-destructive matter.

Second.—There has been a vast improvement in the direction of providing tenements and dwellings with more light and better ventilation, and prohibiting entirely the use of dark interior and ill-ventilated rooms for living and sleeping purposes.

Third.—The evils of overcrowding, while still considerable, and often requiring drastic police interference, are, without question, less serious at the present time than formerly.

Fourth.—Intemperance, while still an evil of great magnitude, is now less of a bodily destructive character than fifty, or even thirty, years ago. While the average consumption of liquor *per capita* may have remained the same (this being a fact difficult to determine), the statement cannot be called in question that the general mass of our people lead to-day more temperate lives and more free from the vice of gross intoxication than during the earlier years of our social history.

Fifth.—There has been a considerable improvement in the feeding of infants and adults with food of more nutritious quality, making for the building of a body of a higher degree of disease resistance. We have substituted the ideal of a robust body

and vigorous health, especially among women, for the anæmic type of girls so common thirty years ago. This result is, in a large measure, due to the greater amount of outdoor life, and also to the public parks and children's playgrounds, which a more enlightened public opinion demands.

Sixth.—Improved economic conditions, especially in the direction of higher wages and shorter hours of labor, substituting possibilities of rest and recreation in place of overstrain and overwork and bodily exhaustion common under earlier conditions of industrial life. What, for want of a better term, may be spoken of as the half-holiday, or vacation habit, is becoming a regular feature of life, even with the most humble laborer. Night labor, as far as possible, is gradually being done away with, resulting in a more healthy development of body and a higher degree of disease resistance.

Seventh.—Child labor, formerly exceedingly common, is now practically prohibited and made impossible by law in most of the States. Constitutions which, under former conditions, would have been prematurely weakened and impaired are now permitted to reach a sufficient degree of maturity to more successfully withstand the inherent disease-producing conditions of factory life and other indoor occupations. It is a well-known fact that occupations, such as the potteries, glass works and similar industries, in which children formerly commenced to labor at very early ages, are the occupations in which the after-lifetime is very considerably below the average and in which tuberculosis and respiratory diseases are of more than common occurrence.

Eighth.—Unwholesome and unsanitary conditions of factory life, of serious effect on health and longevity; dust-producing occupations, especially destructive to lung tissue, and numerous other evil conditions surrounding men and women employed in ill-ventilated factories and workshops have been largely done away with in the light of modern sanitary science through factory and labor legislation. Any one who has studied the diseases of occupation in this country and abroad will concede that these changes for the better in the conditions of factory life have been indeed profound and far-reaching in making for a healthier and a longer life.

Ninth.—School life, or the conditions surrounding children at the impressionable age of the educational period, have been materially improved by slow degrees from the close, overheated schoolhouses of the past to properly lighted, sufficiently roomy and

properly ventilated schoolhouses of the present. Children exposed to the earlier conditions must, unquestionably, have had their health undermined and their disease resistance lowered as the result of hours spent under unsanitary and otherwise unsatisfactory conditions which, in the light of a better knowledge and understanding, are no longer permitted to exist. While much remains to be done to improve the hygienic conditions of school life, a vast amount of improvement in this direction has been made during the past fifty years.

Tenth.—There remains the general social improvement of the mass of our population, making for a higher standard of life and a more deliberate view of life and the worth and value of living. There has never been a time when the commercial value of human life was so clearly recognized as it is at the present time, and the will to live and the will to live well was never before so strongly emphasized in the life of the people. All this, I am satisfied, must have contributed much toward the development of a type less likely to fall a victim to tuberculosis under modern conditions than under the less satisfactory conditions of the past.

We may now consider *the statistical laws* which underlie the occurrence of tuberculosis in modern life. Most of the conclusions which follow are derived from census reports on vital statistics, from the reports of local boards of health, the experience of life insurance companies, and special investigations which need not to be enumerated. As a general rule, the observations and conclusions are limited to the mortality from consumption, which forms approximately 96.5 per cent. of the total mortality from tubercular diseases. Unless otherwise stated, the rates used are 10,000 of population.

1.—The mortality from consumption in the United States has decreased from 25 per 10,000 in 1890, to 19 in 1900. The fall in the death rate during the decade has been 24 per cent.

2.—The mortality from consumption is greater in cities than in rural districts, but there are important exceptions to this rule, to which reference will be made later. The city death rate from consumption in 1900 was 20 per 10,000, against 13 for the rural districts.

3.—The decrease in the mortality from consumption during the decade has been 6 per 10,000 for the cities, against not quite 5 for the rural districts. The social and material progress and changes, to which reference has been made in the introductory

remarks, has, without question, been greater in the cities than in the country districts.

4.—The mortality from consumption is greater among men than women; but here, again, we meet with important exceptions to a general rule. The death rate of males in 1900 was 19 per 10,000, against 16 for females.

5.—The mortality from consumption among males in the cities was 21 per 10,000, against 16 for females—a difference in favor of females of 5 per 10,000 of population. In the country districts the death rate was 12 for males and 14 for females—a difference of 2 per 10,000 in favor of males. In other words, the mortality of males in cities is higher than the corresponding mortality of males in rural districts; also the mortality of females in cities is higher than the corresponding mortality of females in rural districts. These facts are deserving of careful consideration.

6.—The decrease in the mortality during the decade 1890-1900 was 5 per 10,000 for males and six for females. This fact would seem to warrant the conclusion that, in a general way, the conditions making for a lower death rate from consumption have been more favorable to women than to men, and the tendency toward a lower death rate has been more pronounced in the case of women in cities than in rural districts.

7.—The death rate from consumption is extremely high among the colored population, including in that term the Chinese and Indians, but primarily and almost exclusively the negro element. In 1900 the death rate of the white population was 17 per 10,000, against 49 for the colored element—a difference of 32 in favor of the white race. In other words, among the same number of population to every 100 deaths from consumption among the white population there were 288 deaths among the colored, indicating the most extraordinary continued predisposition to death from a particular disease of which we have record in the annals of hygiene and vital statistics.

8.—The death rate of the colored population in cities was 50 per 10,000 against 19 for the whites. In the rural districts the death rate of the colored was 32, against 13 for the whites. If we reduce the rates to a common basis, we find that to every 100 deaths of the white population in country districts there were 246 deaths among the colored population. In other words, the higher mortality of the negro population from consumption and other tubercular diseases is, unquestionably, primarily the result of race.

9.—During the decade 1890-1900 the decrease in the mortality

from consumption was practically the same for both races, having been 5.65 per 10,000 for the whites, and 5.55 for the colored. In the rural districts the decrease in the mortality of the white population was 4.6, and for the colored 4.3. In other words, as far as it is possible to judge, the decrease in the mortality from consumption has been largely the result of an improved environment affecting both races to practically the same extent. The wide variation in the mortality of the two races from this disease remains practically the same, and apparently unaffected by the more favorable conditions under which the present negro population lives.

10.—The native white population of native stock—that is, those having both parents native born—experience a death rate from consumption considerably below the general average. In 1900 the rate was 13 per 10,000 for the native born of native stock, against 17 for the aggregate white population. The death rate decreased from 17 in 1890 to 13 in 1900. Accurate comparison cannot be made with the population largely or wholly of foreign extraction, except for a few nationalities which have been in this country for many years.

11.—The foreign element in the United States in vital statistics is usually determined on the basis of the country of birth of the mother. This has been found the most satisfactory and accurate method yet devised to ascertain the true relation of nativity to disease predisposition and mortality. Limiting our observations to ages 15 to 44, we find that the death rate from consumption of those with mothers born in the United States was 16 per 10,000, living at this period of life, 15 for the English, 20 for Canadians, 21 for Germans, 23 for Scandinavians, 24 for Bohemians and 43 for the Irish. In other words, from the limited investigations which have been made into this branch of vital statistics, the Irish population in the United States experienced a death rate from consumption far in excess of the corresponding death rates of other nationalities. The rate, however, is far from being as high as the death rate of the colored population at this period of life, which was 59, compared with 43 for the Irish and 23 for the total white population.

12.—The average age at death of persons dying from consumption is 35 years, but the true incidence of the mortality falls upon ages 15 to 35, when from 35 to 50 per cent. of the deaths from all causes are the result of tuberculosis. In other words, at ages

15 to 35 from one-third to one-half of the entire mortality is the result of consumption and other tubercular diseases.

13.—The death rate per 10,000 living at different periods of life was 4 at ages under 15, 25 at ages 15 to 43, 23 at 45 to 64, and 26 at 65 and over. In proportion to the number living, the mortality from consumption at ages over 15 is about the same, speaking generally, throughout life. It is therefore of some importance for us to consider the indicated improvement in the mortality from this disease in its relation to age, for, other things equal, a subsequent decrease in the consumption mortality at ages 15 to 44 is of far greater importance to the nation than a similar decrease in the mortality from this disease at more advanced ages.

14.—The mortality of males from consumption exceeds the mortality of females at all age periods by 3 per 10,000 at ages 15 to 44, by 12 at 45 to 64, and by 6 at ages 65 and over, or, speaking generally, the difference in the disease liability of the two sexes is most marked at ages 45 to 64, when the after-effects of factory and indoor life, as well as of intemperate habits, become more apparent.

15.—This law, however, is subject to a very important exception. While the death rate of males is higher than the death rate of females, this is only true for the cities, for in the country districts, at ages 15 to 44, the death rate of men is 16 against 20 for women—a difference which we would ascribe to the after-effects of pregnancies, less properly taken care of in rural districts than in the cities, where proper medical attendance is more readily available and more generally taken advantage of.

16.—The decrease during the decade in the mortality from consumption at the three age periods considered has been 7 per 10,000 at 15 to 44, 9 at 45 to 64, and 11 at 65 and over. In other words, the relative decline in the death rate has been most pronounced at the comparatively unimportant age period of 65 and over, while the decrease has been least at the age period when the commercial and economic value of human life is highest.

It would carry us too far to further extend this analysis by sexes and ages, with distinction of life in cities and rural districts, but we may point out that at each period of life the decrease in the mortality from consumption during the decade has been greater in the cities than in the rural districts.

17.—Conjugal condition profoundly modifies the mortality from various causes, and much, if not most, from consumption. A critical analysis of the vital statistics by conjugal condition must needs take into account the elements of age and sex, but this

would make a brief discussion impossible, while a lengthy discussion would be out of place. Males at ages 15 to 44 show the highest death rate from consumption among the widowers and among the singles at ages 45 and over. We would attribute this excessive mortality at ages 15 to 44 among widowers to the probable transmission of the disease from wife to husband, while at ages over 45 we would attribute the excessive death rate of the single from tuberculosis to habits of life detrimental to longevity.

18.—Among females the death rate from consumption is highest among widows at ages 15 to 44, and among the single at ages 45 and over, but the differences are not so pronounced as among males of different conjugal status.

19.—Both sexes show the lowest death rate from consumption among married at practically all periods of life. The death rate of married women at ages 45 to 64 from consumption is exceeding low—only 15—compared with 22 for males of corresponding age.

20.—Married women at the child-bearing period—15 to 44—experience a higher death rate from consumption than married men, the rate being 21 for the former, against 24 for the latter. The difference is significant, but not very great. It is quite probable that these differences are greater in rural districts, but we have not the necessary data to confirm this view.

21.—Widowers at all ages show an extremely high mortality from consumption when comparison is made with the mortality of widows of corresponding ages. At ages 15 to 44 the death rate of widowers was 67, against 36 for widows; at ages 45 to 64, widowers 49, widows 19; and at ages 65 and over we find the rate to have been 31 for the former, against 21 for the latter.

22.—We note further an anomaly in vital statistics and in marked contrast to the general laws of mortality, that the death rate from this disease among widowers is highest at the youngest ages, while lowest at the most advanced period of life (67, 49, 31). This is highly significant, and would seem to warrant the conclusion that the higher mortality of widowers at early ages is the result of disease transmission from wife to husband. Conversely, there would seem to be a lesser liability in the transmission of the disease from husband to wife. The probable reasons for this cannot very well be discussed on this occasion.

23.—Occupation has already been referred to as an element making for a high death rate from consumption among males at certain ages and under certain well-defined conditions, especially

:ity life. We are confronted, however, with the difficulty of
:fly discussing this aspect of the problem on account of the
essity of a critical analysis by age periods and length of trade
The subject-matter is complicated by the fact that the census
)rts do not show the mortality of males in specified occupa-
s from specified diseases by specified periods of life. Since
age distribution of persons in different employments varies
:ly, it would be misleading to compare crude death rates ex-
with the greatest possible caution in selected industries,
re the elements are, as far as known, comparable.
:ales in all occupations, according to the census, experience a
tality from consumption of 24 per 10,000. In the profes-
al occupations, where the average age of the living is quite
ı, the relative mortality is correspondingly low, being 12 for
gymen, 14 for lawyers, and 17 for physicians. It, however,
ıfe to say, from a study of other data, that the mortality from
disease among men in professional occupations is, in fact,
:edingly favorable. Persons in the mercantile and trading
s experience an average death rate of 17 per 10,000, hotel-
)ers and boarding-house keepers a rate of 21, saloon and res-
ant keepers a rate of 29, barbers and hair dressers a rate of
laborers a rate of 37, book-keepers a rate of 40, ser-
:s a rate of 43, printers a rate of 44, cigar makers a rate
48, and stone cutters a rate of 54. These remarkable
:rences in the death rate from consumption among men in
:rent employments are extremely suggestive and deserving of
most careful consideration, for, in the writer's opinion, there
be no more effective measures tending to the stamping out of
disease than active efforts in the field of the diseases of occu-
)n and a propaganda against the still considerable unhygienic
litions of factory life. The high death rate of servants, which
)nfirmed by corresponding data for female domestics, is also
ıly significant.
:o meet the possible criticism of the use of these data, which
)re the age factor, I have carefully examined into the more
ıtific reports on the vital statistics of England and Wales. If
ake, for illustration, the age period 25 to 34, we find that the
h rate of clergymen from consumption was 16 per 10,000,
or physicians, 19 for lawyers, 23 for artists, and 40 for musi-
s. Among men in commercial and agricultural employments
death rate was 17 for agriculturists, 22 for grocers, 27 for
ufacturing chemists, 28 for druggists, and 41 for general

shopkeepers. For persons in general trades and industries the death rates were 49 for tobacconists and cigar makers, 48 for book-binders, 48 for barbers, and 40 for shoemakers. Among persons in recognized unhealthy occupations the death rate was 60 among hotel and inn servants, 51 among glass workers, 50 among printers, 47 among carpet and rug manufacturers, 43 among zinc workers, 42 among copper workers, 41 among dyers, 41 among saloon-keepers, and 39 among brass workers. Among persons in recognized dangerous and unhealthy occupations the rate was 43 among lead miners, 34 among tin miners, 31 among copper miners, and 28 among coal heavers. Among common laborers, servants, etc., the rates were 70 among costermongers and hawkers, 44 among messengers and porters, 34 among general laborers, and 23 among domestic servants. Among men in all occupations at the age period of 25 to 34 the death rate from this disease is 26 per 10,000, which compares with 34 for persons in recognized unhealthy occupations, 27 for persons in general trades and industries, 21 for persons in professional occupations, and 32 for common laborers and servants.)

24.—The season of the year, as far as it is possible to judge, affects the mortality from consumption only to a limited extent. The mortality in the United States is highest during March, April and May, and lowest during August, September, October and November. The month of highest mortality during the census year 1900 was March, with a monthly death rate of 1.8 per 10,000 of population, and the lowest were June and September, with monthly death rates of 1.3. The information is not yet sufficient to warrant final conclusions.

25.—The mortality from tuberculosis varies widely in different localities, but we question seriously whether these differences are the result of climate rather than of material variations in the age, sex, race, nativity and occupation distribution of the population. The registration area of the United States, unfortunately, does not include a sufficient number of representative States, but, limiting our observations to New England, New York and New Jersey, we do not find the evidence conclusive that local variations in the death rate have been the result of variations in climate. As far as it is possible to judge, the variations appear to be rather the result of occupation, etc., than of climate.

25a.—In illustration of this point, I may add a summary comparison of the mortality from consumption in certain American cities during the five years 1896-1900. The rates are per 10,000

of population and are as follows: Cities with high death rates: San Francisco, 29; Orange, N. J., 27; New York, 26; Newark, N. J., 26; Pueblo, Col., 26; Jersey City, N. J., 25; Boston, 24; Brooklyn, 22; Cambridge, Mass., 22; Paterson, N. J., 22; Providence, R. I., 22; Holyoke, Mass., 21; Worcester, Mass., 21; Cincinnati, 21; Philadelphia, 21; Lowell, Mass., 21.

Cities with low death rates from consumption: Passaic, N. J., 17; Manchester, N. H., 17; Binghamton, N. Y., 17; New Bedford, Mass., 16; Fall River, 16; Chicago, 15; Lynn, Mass., 14; Gloucester, 14; St. Paul, 14; Milwaukee, 13; Minneapolis 12; Spokane, 12.

In Southern cities the mortality from consumption is, as a rule, very low among the white population: New Orleans, 22; Washington, D. C., 19; Memphis, 17; Augusta, Ga., 16; Nashville, Tenn., 16; Atlanta, 16; Richmond, Va., 14, and Charleston, S. C., 14. These comparative statements are extremely interesting and valuable in that they localize the mortality from consumption with sufficient accuracy to point out where active efforts to suppress the disease are needed most. It is a matter of regret that I have not the data for Baltimore, since the health reports do not contain the separate tabulation of the deaths by race.

26.—The census data are not published in sufficient detail to permit of a rearrangement of the mortality by geographical sections of the country according to latitude, longitude and altitude, or with special reference to certain topographic features, such as location of cities on lakes, in river valleys, at high altitudes, etc. My inquiries into the possible relation of these conditions to the distribution of consumption are as yet in a very unsatisfactory state, and no definite conclusions can be advanced. There are other factors which have to be taken into account, as, for illustration, the attraction of a large number of tuberculosis patients to cities like Denver, Los Angeles, San Antonio, etc., which would tend to produce a high local death rate from this cause when, as a matter of fact, the climatic conditions are in all probability exceedingly favorable to a cure, if not a certain prevention of the disease.

27.—A study of the relation of consumption to the elements of climate, which has almost a literature of its own, confirms the view that certain climatic elements unquestionably favor the development of the disease, while others materially hinder it. The writer has not made a sufficiently extensive study of these elements to warrant him in advancing definite conclusions.

28.—The relation of the mortality from consumption to surface

geology, soil and topography has never been exhaustively investigated, or at least not reported upon in such a manner that the results can be utilized in this summary of the general elements of the mortality of this disease. It is, however, a generally accepted theory, and an apparently well-proven fact, that the mortality from consumption is highest in localities with a damp soil or a clayey subsoil, making natural drainage difficult, if not impossible. The vital statistics of Baltimore have been investigated with this end in view, but the results as published by Dr. Billings are not conclusive. It, however, is reasonably safe to say that the death rate decreases with increasing altitude, and that the death rate decreases with increasing dryness of the atmosphere.

29.—The relation of the mortality from consumption to class of dwellings, tenements and institutions, such as prisons, asylums, convents, etc., has been investigated to a reasonably sufficient extent, and the conclusions would seem warranted that overcrowding is in a large measure responsible for the development of the spread of the disease, and the mortality in such institutions in the absence of rational sanitary precautions, is, as a general rule, excessive.

30.—The relation of the mortality from consumption to social and economic conditions, especially to wealth and poverty, habits, such as alcoholism, etc., has been sufficiently inquired into to warrant the conclusion that consumption is much more common among the poor than among the rich, and this may be attributed to imperfect or unsatisfactory diet. The mortality from consumption is also known to be more excessive among persons of intemperate habits, and this is proven by the high death rate of saloonkeepers and bartenders from tubercular diseases.

31.—The relation of the mortality from consumption to religious confession has been investigated, especially by Korosi, Dr. Billings and Dr. Fishberg, and the conclusion would seem warranted that the mortality from this disease is extremely low among persons of the Jewish faith. Whether this is the result of the dietary laws of the Hebrews has not yet been sufficiently established. It, however, is reasonably proper to assume that some such a relation exists. The Jews, however, are justly praised for their high order of domestic life, which, as elsewhere pointed out, has a direct relation to the mortality from tuberculosis.

32.—The relation of the mortality from consumption to personal physical condition as determined by anthropometry, especially in the interrelations of height, weight, chest expansion.

respiration, temperature, pulse rate, etc., has not been sufficiently investigated to warrant entirely safe conclusions, but this much may be affirmed, that persons predisposed to consumption are almost invariably persons of inferior physical development, with evidence of imperfect nutrition, resulting in a body weight about ten pounds below the average. This is a field which is fully deserving of some careful inquiry and consideration, for so far the contributions have been very fragmentary and of only limited value.

33.—The earlier belief in the possible heredity of consumption of the child from the parent, or from collateral branches of the family, is one which, in the light of modern research, may be reasonably assumed to have been overestimated, except in so far that there can be no question but that a physical constitution predisposing to tuberculosis is often, and perhaps frequently, transmitted from parent to child. On this phase of the problem we have also need of additional data covering a large area of observation to eliminate the possibility of erroneous interpretation of the facts.

34.—The duration of the disease from the time of infection to the time of death is usually given as two years or thereabouts, but on this point statistical information is required which would certainly be of great value. No definite law at the present time is known to me which would warrant final conclusions regarding this point.

35.—Relative to the organs affected by tuberculosis, I have already pointed out that of the normal mortality about 96.5 per cent. is represented by consumption of the lungs. It would be desirable, however, to have a comprehensive study made of this aspect of the problem.

36.—The result of treatment in hospitals and sanatoria, with strict regard to the duration of the disease and the race, sex and occupation of the patient, have not as yet been determined with sufficient accuracy, but for a few institutions we have quite trustworthy data which are certain to be of great value in the future. The earlier experience has been materially modified in late years, and it is probably safe to say that three months is the lowest limit of effective sanatoria treatment. It may not be out of place for me to refer to the admirable statistics published annually in the reports of the Johns Hopkins Hospital, in a measure the most useful and practical which are available for any hospital in this country.

CONCLUSIONS.

My object in presenting for your consideration the general statistical laws of tuberculosis is to emphasize the need of a broad basis of sound knowledge for any far-reaching sanitary or other measures which may be adopted for the purpose of diminishing by associated effort the largely preventable amount of disease and mortality from tuberculosis. The facts would seem to warrant the view that it is possible to so localize the mortality from tuberculosis that an energetic campaign against consumption is practically certain to produce far-reaching results. If we determine upon a campaign against consumption as we find it to occur among persons in certain recognized unhealthy employments, or living in certain recognized unhealthy localities, or under certain ill-health-producing conditions, there is no doubt in my mind but that within a few years a marked diminution in the death rate will result from such well-directed and intelligent efforts. By preventing the disease in the first place, it will not be found necessary to erect immense and costly institutions for the cure of the disease. I am certain, from a careful study of the facts in the case, that such efforts should be primarily directed against unsanitary workshops, ill-health-producing occupations and the employment of physically unfit types of men in industries in which the death rate from consumption is extremely high. By adopting intelligent measures in clear recognition of the laws which determine a high or low mortality from this disease I am sure that a large portion of the present mortality from this disease will be done away with.

MORTALITY FROM CONSUMPTION IN FOUR AMERICAN CITIES.

(*Rates per* 10,000 *of Population.*)

Years.	New York City.	Boston.	Philadelphia.
1851-1860	42.2	46.3	....
1861-1870	38.9	40.7	32.1
1871-1880	39.3	39.9	31.7
1881-1890	37.7	38.0	29.0
1891-1900	26.7	26.2	22.1

	Baltimore. (White and colored.)
1876-1880	36.3
1881-1885	33.8

1886-1890	28.3
1891-1895	24.3
1896-1900	21.3

(Above data compiled from official health reports, supplemented by correspondence with health departments.)

MORTALITY FROM CONSUMPTION BY RACE.

(*Rates per* 10,000 *of Population.*)

Registration Area (Total).

Years.	Aggregate population.	White population.	Colored population.
1890	24.5	23.0	54.6
1900	18.7	17.4	49.1

Registration Area (Cities).

Years.	Aggregate population.	White population.	Colored population.
1890	26.6	24.7	56.3
1900	20.5	18.8	50.4

Registration Area (Rural).

Years.	Aggregate population.	White population.	Colored population.
1890	18.1	17.8	36.5
1900	13.4	13.2	32.3

(Compiled from United States Census of 1900, Vital Statistics, Part I, p. clxxvi.)

MORTALITY FROM CONSUMPTION IN THE REGISTRATION AREA—UNITED STATES.

DEATH RATES BY AGE, COLOR AND BIRTHPLACES OF MOTHERS.

(*Rates per* 10,000 *of Population.*)

Color and Birthplaces of Mothers.	Ages. Under 15	Ages. 15-44	Ages. 45-64	Ages. 65—over
White	3.2	23.5	22.1	25.2
Colored	24.6	58.7	51.8	54.9
Mothers born in—				
United States	2.8	16.3	13.2	17.6
Ireland	4.2	42.8	34.1	32.5

Germany	2.7	20.6	20.8	23.5
England and Wales ..	2.7	15.1	17.3	23.4
Canada	3.5	20.0	16.4	23.7
Scandinavia	3.2	23.4	26.7	23.7
Scotland	3.3	20.1	20.2	23.9
Italy	5.1	15.0	15.7	14.5
France	4.7	22.1	20.0	16.3
Hungary	3.9	11.3	12.5	18.7
Bohemia	1.3	23.5	12.5	10.1
Russia	2.7	13.1	17.3	24.9
Poland	1.1	6.7	10.4	24.3
Other foreign countries	4.6	18.9	26.4	23.4

(Compiled from United States Census of 1900, Vital Statistics, Part I, p. clxxviii.)

HOUSE INFECTION OF TUBERCULOSIS.*

By LAWRENCE F. FLICK, M.D.,

Director of the Phipps Institute for the Study, Prevention and Cure of Tuberculosis, Philadelphia.

The kaleidoscopic phenomena of this earth as we see them around us are the result of a continuous alternation of life and death. In this beautiful panorama death is as necessary as life. Something is always dying that something else may live. Inorganic matter continuously is being changed into organic matter and organic into inorganic. For changing organic matter into inorganic matter God has created the micro-organic world.

A micro-organism which, perhaps, has slipped away from its natural place in organic nature, and in consequence has done much damage to man, is the tubercle bacillus. In the great division of organic matter it generally is credited to the vegetable kingdom. In a classification of micro-organisms it is technically known as a facultative saprophyte. By this is meant that ordinarily it gets its living as a parasite on some higher organism, but that it may subsist on dead organic matter as a saprophyte. In a sub-classification of micro-organisms it is known as a facultative anaërobic parasite. By this is meant that ordinarily it grows in a tissue from which air is excluded, but that it may

*Read at the Maryland Tuberculosis Exposition, January 26, 1904. From Maryland Medical Journal, February, 1904.

grow in some substances, under certain conditions, in the presence of air.

When the tubercle bacillus grows in the tissue of a human being or of an animal it gives rise to a condition which has forcibly arrested the attention of man because of the suffering, sorrow, and misery which accompany it and follow in its wake. In the early history of medicine this condition was named phthisis and consumption. In more recent times it has been divided into two epochs, the earlier being called tuberculosis and the later consumption. In earlier times, too, the condition was viewed by mankind generally as a providential visitation, the punishment for sin, touching not only the immediate offender, but reaching the offspring to the third and fourth generation. Science has demonstrated that it is a mere episode in nature subject to natural laws and absolutely under the control of man's will.

Man is interested in tuberculosis because it is a disease. The same processes and phenomena in other fields of nature give pleasure to man, but here they give discomfort, and are followed by sorrow and misery, because man himself is the field of operation. The word disease means want of ease. Quite naturally, man has given much thought to how to avoid getting tuberculosis and how to get rid of it when it afflicts him. By reason of his superior intelligence man has always been able to control his organic foes so far as visible objects are concerned, but in his fight against the micro-organic world he is confronted with a much more serious problem. Much has been done, however, to throw light upon this newly-discovered enemy, and already it is demonstrated that man need no longer get tuberculosis, and that if he is so unfortunate as to get it, he need not die of it. Unfortunately, the knowledge which makes this new dispensation possible is still in the hands of a few.

All diseases which are caused by micro-organisms are communicable. This is a self-evident proposition. Whatever is living can only come from a parent, and phenomena which are due to the growth and development of living organisms cannot arise except by reason of the growth and development of those organisms. There is a difference, however, in the manner in which parasitic micro-organisms are conveyed from one person to another. Some are conveyed through the instrumentality of insects, some by means of water, and others by contact, direct or indirect. Some parasites have two kinds of hosts, a major and a minor host; some can reproduce themselves outside of a host, and others

always remain dormant when out of the host. Parasites which have two hosts and parasites which can reproduce themselves outside of a host may be conveyed from one person to another over long distances, while parasites which are conveyed by contact can only be conveyed within a limited, circumscribed environment. The yellow fever parasite, for instance, is conveyed through the mosquito, the typhoid fever parasite by water, and the tubercle bacillus by contact.

All diseases which are conveyed by contact are termed contagious. Contagious diseases are not necessarily alike, however. There is a great difference in the intensity of contagion. The acute contagious diseases are much more intensely contagious than the chronic contagious diseases. In principle the contagion of all is the same, but in practice the method differs widely. Smallpox, measles and scarlet fever, for instance, are contagious in exactly the same sense as tuberculosis, so far as the principle is concerned—that is, they are conveyed by contact—but the intensity of the contagion is so much greater with them than with tuberculosis that practical measures for the prevention of the former would in no sense apply to the latter. Smallpox, measles and scarlet fever affect the whole body, and contagion is rapidly given off from the entire body. Tuberculosis is a local disease, and contagion is given off from one or two points only. In smallpox, measles and scarlet fever the matter which carries the micro-organisms may be invisible; in tuberculosis it always is gross and easily seen. In smallpox, measles and scarlet fever places and things soon become intensely contaminated; in tuberculosis it takes a long time to produce such a result. Intimate association, therefore, with a person suffering from smallpox, measles and scarlet fever without contracting the disease is impossible, unless the person thus exposed has an immunity from vaccination or previous attack, while intimate association with a consumptive without contracting the disease is quite feasible.

The contagion of tuberculosis, indeed, is of a kind by itself. It differs somewhat from the contagion of every other disease of which we have knowledge. It is so unique that writers have had some difficulty in finding an epithet descriptive of it. This is the reason why many writers object to calling tuberculosis contagious. Some would have us call it communicable, but this term is too generic. Others have suggested the epithet infectious for it, and this does not fit at all, because it has a specific meaning which only applies to such diseases as malaria and yellow fever.

The most striking feature about the communicability of tuberculosis is that it depends almost entirely upon the house. An inclosure of some kind is so necessary for the conveyance of the disease from one person to another that contagion is impracticable without it. It is therefore with good reason that we use the phrase house infection of tuberculosis when we speak of the practical manner in which the disease is spread in a community. The word infection, of course, is used in the broad sense of conveyance, and the word house in the broad sense of an inclosure. The phrase tells pretty nearly the whole story of the communicability of tuberculosis, and covers the entire proceeding from the beginning to the end—garnering the seed, preparing the soil, implantation, rearing the tender plant, nurturing the full-grown shoot, maturing and harvesting.

The house is the granary of the tubercle bacillus outside of its host. Were it not for the house the tubercle bacillus would soon have to perish from the face of the earth. It could not be preserved. Sunlight, air and water are its natural enemies. The water dissolves it out of its cache, and the sunlight and air destroy it. How long tubercular matter may remain vital in the open air has not been definitely determined, but all agree that the time is very short. Even when the bacilli in such matter are not killed they are weakened so that they will not readily take root when planted. In the house, on the contrary, tubercular matter may remain vital for a long time, because it becomes dry and the broken-down tissue serves as a cache for the bacilli. Even when the matter becomes finely pulverized so that the bacilli no longer have so much protection, it remains vital for a long time, because the sun and air cannot get to it.

Ordinarily the tubercle bacillus is dependent upon other microorganisms for its exit from its host. These are the streptococcus and the staphylococcus. They are pus-producing organisms, and are very adept at destroying tissue. When they join forces with the tubercle bacillus they kill and soften the tissue which has been invaded by the tubercle bacillus, and then Nature casts it out. A double purpose is served in this way, the tubercle bacillus is helped out of its host and is given a protective covering toward preservation while out of the host. The broken-down tissue which is thrown out forms the protective covering.

In the transition of the tubercle bacillus from one host to another we have a beautiful illustration of Nature's jealous care of

every form of life. The tubercle bacillus is a motionless, helpless micro-organism, which can grow and reproduce itself only under certain conditions in a definite soil, and which requires during the interim between its exit from one host and its entrance into another special protection, and for admission into a new host special opportunities. These are secured for it indirectly through its toxin and the toxins of its associates. By sensations set up in the nervous system it lures its victim into the very place where exist the best conditions for the preservation of its species and the best opportunities of finding a new host. Consumption is the autumn of tuberculosis, the blossom grown into ripe fruit. When it comes on the victim, by reason of his chilliness, malaise, and general feeling of helplessness, seeks shelter in some inclosure, and is deluded with the idea that the farther he can get away from sunshine and fresh air the better are his chances of recovery. The house thus becomes the harvest field of the ripe tubercle bacillus, and the seed quite naturally falls into the very place which by nature is intended for its granary.

The house also prepares soil for the tubercle bacillus. We have every reason to believe that the bacillus cannot get a foothold in perfectly healthy, normal tissue. It is quite likely, indeed, that primordially the tubercle bacillus was a saprophyte only, and that its function in the world was to change dead organic matter into inorganic matter. It is easy to conceive how gradually it may have evolved into a parasite by growing on tissue which, while not dead, was much debased. At any rate, even at the present time it does not seem to be able to invade tissue until the tissue has been injured in some way, either by malnutrition, by traumatism, or through the agency of some other micro-organism. Malnutrition is one of the most common predisposing causes of tuberculosis.

The physical life of man and animals is a chemical process. There is a combination of certain elements through the instrumentality of a living cell with evolvement of beings endowed with life. Food, air and water are the substances used in the process. In proportion as these substances are at hand in proper quantities the being evolved is a healthy one, and in proportion as any of the substances are deficient or defective the being is an unhealthy one. Of the three substances required in this chemical process air is, perhaps, the most important, and certainly the most necessary. Life may be maintained for some days without food and water, but for a few minutes only without air. The same is true

of health. A person may keep fair health on a stinted supply of food and water for a long time, but soon succumbs to a stinted supply of air. This probably is due to the fact that air plays a double rôle in health. It not only carries in oxygen for chemical purposes, but it carries out poisonous products of chemical action. It is believed by some that rebreathed air produces soil for the tubercle bacillus more through the poisonous products of combustion which are disseminated in the air than by reason of deficiency of oxygen. Probably it does by both. At any rate, housed human beings and animals are very prone to tuberculosis. Deficiency of oxygen certainly leads to malnutrition. Too much food and too little air not only lead to defective metabolism, but throw upon the organs of the body poisonous products which must be gotten rid of to the detriment of the whole system.

Implantation of the tubercle bacillus is greatly facilitated by the house. For implantation prolonged intimate contact with a person, place, or thing which has been intensely contaminated with tubercular matter is necessary. The mere presence of a few tubercular bacilli is not sufficient. Everybody has some resisting power to tuberculosis, and with everyone there is a minimal dose of tubercle bacilli which will give an implantation. No doubt this dose differs with different people, but resisting power of some kind exists to some extent in everyone. Even in inoculation experiments on animals a minimal dose has been found below which injections prove negative. This minimal dose in a sense measures the individual's fighting capacity against the disease. So long as the minimal dose is not reached an implantation cannot take place. Frequent warfare against a dose below the minimal dose increases the resisting power of an individual and raises the minimal dose. With animals the minimal dose which can give an implantation gradually can be increased until almost complete immunity has been established. Experiments upon animals have been made by inoculation. It is quite probable that by the natural mode of entrance of the tubercle bacillus into the system the minimal dose is larger than by inoculation. The natural mode of entrance is by the alimentary canal or the respiratory tract. At both of these ports of entry there is strong opposition to admission. The gastric juice has some germicidal powers, and all along the respiratory tract there are devices for keeping out micro-organisms. Beyond the ports of entry lie the lymphatics and lymphatic glands, and beyond these the phagocytic bodies of the blood, all of which wage war against micro-organisms that

may pass the ports of entry. From what has been done experimentally on animals and from what we have been able to observe clinically on man, we have good reason to believe that the minimal dose of tubercle bacilli necessary for an implantation by the natural mode of entrance is quite large. This is not a mere speculation either. Out of every five people who are intimately exposed to the contagion of tuberculosis for a long period of time under the most favorable conditions for an implantation only one person develops the disease. This shows that implantation is exceedingly difficult even under most favorable circumstances.

An inclosure is the one place in which contamination with tubercular matter can become sufficiently intense to create an environment capable of overcoming the resisting power of man and producing an implantation. It is only in an inclosure that vital tubercular matter can accumulate. In the open air, water, sunlight and air devitalize it nearly as rapidly as it is given off. Tubercular matter ejected in a house, unless immediately devitalized, artificially dries and is distributed about in particles varying in size from big chunks to impalpable dust. In these particles the bacilli are cached and preserved. Gradually all the particles are reduced to dust, either by trituration, oxidation, or the action of saprophytes. This tubercle-laden dust settles on the walls, on furniture, and on everything in the inclosure. In the course of time there is quite an accumulation of vital tubercular matter in such a place, and every time the air is disturbed tubercle-laden dust is set in motion. Here, then, finally is an environment capable of giving an implantation of tuberculosis. Occupancy of such a room means constant inhalation and frequent deglutition of tubercular matter. Tubercle bacilli continuously find their way into the system, and it is only a question of time when more have gained entrance than can be successfully withstood by the guards and disease-fighters of the body. The result is implantation of tuberculosis.

The kind of inclosure which offers the best environment for the implantation of the tubercle bacillus is, first, the home, and second, the workshop. The home is of all places most prolific of new implantations of tuberculosis. It was on this account that in by-gone days tuberculosis earned for itself the reputation of being an inherited disease. Tuberculosis is a family disease. It can most easily be implanted around the hearthstone. It follows the family tree in its distribution, and when it once gets into a family it follows that family in all directions until it either has exter-

minated the family or exhausted the soil, and has made what is left of the family immune. The part of the home in which implantations most frequently take place is the bedroom, and next to the bedroom the dining-room. The bedroom usually is the place where the victim of tuberculosis spends his last weeks or months—a period during which the disease is most intensely contagious. Among the very poor the dining-room often is used as a bunking-place for the stricken one until a day or two before death. Under such circumstances the dining-room becomes very much contaminated and becomes a prolific source of new implantation.

The workshop is a very common means of spreading tuberculosis. By workshop, of course, is meant any inclosure in which one or more people are employed. Tuberculosis is an extremely chronic disease, and usually runs a long course even in its contagious stage before its victim is incapacitated for his usual occupation. Some people work with the contagious stage of tuberculosis for the greater part of a working lifetime, occasionally being thrown out of employment for a few weeks or months on account of an exacerbation, and again returning with as much vigor as before. Unfortunately, habits of men and women in the matter of spitting make it easy for a consumptive to contaminate his immediate environment in a shop, if not the entire shop. One consumptive, perhaps, cannot contaminate a large shop so as to produce an infectious environment of the entire shop, but he can produce an environment around his own stand capable of implanting the disease in one or more of those next to him, and before long he has associates in the task of polluting the shop. In a workshop in which a case of tuberculosis exists careful investigation will reveal the presence of other cases in various stages of the disease. Deaths will occur from such a shop at regular intervals for an indefinite period so long as the shop is permitted to remain contaminated.

Inclosures such as hotels, churches, public halls, places of amusement, and public conveyances, in which people stop for a short time only, are not apt to give rise to many implantations of tuberculosis for two reasons. First, because a consumptive rarely remains in them long enough to produce a contagious environment capable of giving an implantation, and secondly, because healthy people seldom remain in them long enough to get an implantation. There is some danger of contracting the disease in such places for people who are employed in them in the capacity

of cleaners and caretakers, but for the casual visitor practically there is no danger.

Things which have been intensely contaminated by having been used for a long time by a consumptive may give the disease to others when kept or used indoors. In the open air they may be harmless, unless worn upon the person. Contaminated furniture, carpet, and hangings of various kinds, when taken into a perfectly sterile house, may themselves contaminate the house sufficiently to create an environment capable of implanting the disease. The tubercular matter adhering to such articles is distributed about and settles on walls and floors. In the open air, on the other hand, tubercle-laden dust from such articles is apt to be scattered about over such a wide area as to make it impracticable for any one person to get enough of it to give rise to an implantation.

The house nurtures the tubercular growth when an implantation has taken place. Mere implantation of the tubercle bacillus does not necessarily mean a development of a full-fledged tuberculosis. The disease always begins in a very small way, and then attracts practically no attention. The first crop develops and runs through its course, and a second follows perhaps a little larger than the first. This is followed by a third and fourth, each a little larger than the preceding one, and thereafter another larger still, until finally so much tissue has been invaded and destroyed as to make death inevitable. At any time during the progress of the disease prior to the destruction of tissue essential to normal functions of the body the economy has within itself the power of throwing off the disease. Autopsies prove that this often is accomplished by nature unaided by medicine. It probably would be accomplished in all cases were it not for the house.

In the beginning of the tubercular process the tendency to recovery is so great that the slightest aid to nature may turn the tide toward recovery. The process by which recovery takes place probably is healthy metabolism—that is, a perfect change of food into tissue. Implantation has taken place because the individual temporarily has been a little below par as a result of improper food, insufficient air, overwork, dissipation, an attack of some other disease, or some such matter, one or all. Under proper conditions the implantation is rooted up before it can grow into tuberculosis. All that may be needed is a little rest, a little extra food, and a little more fresh air. In some cases recovery might take place if a little rest could be had, even without extra food and

air; in others if better food could be had, even though no rest could be taken and the air supply could not be changed. But in all recovery would almost surely follow a life in the open air, in spite of bad food supply and overwork. Life in the open air enables one to digest coarser food and to do more work without fatigue than is possible indoors. This is probably due to the fact that in the open air the poisonous products of combustion are promptly removed from the system, and thus are prevented from embarrassing the entire organization. To cure tuberculosis we must have perfect metabolism, and this we only can have when enough fresh air is taken into the system night and day to oxidize the food and cleanse the blood. Imperfect metabolism predisposes to tuberculosis by debasing the tissues and making soil for the tubercle bacillus.

House life undoubtedly plays an important rôle throughout the entire course of tuberculosis to its culmination in consumption and death. With every recurring crop of tubercle the organs of the body become more embarrassed, and the economy is less able to carry on the warfare against the disease. When the disease is in the lungs, as it frequently is, the air supply grows less with each destruction of lung tissue. Fortunately, nature has given all air-breathing creatures ample lung capacity, enough and to spare, so that a great deal of lung tissue may be destroyed without interfering with the functions of the body, provided the air supply is right. Under these circumstances other organs, no doubt, supplement the lungs in their functions of elimination. Everything hinges upon an ample supply of fresh air, however. When this is at hand healthy metabolism may be maintained even when the disease is advanced, and through this health may again be reached. Tuberculosis makes its progress because its victim is shut up in a house where he cannot get fresh air. Unfortunately for the poor, an amply supply of fresh air is impossible. Their homes, as well as their workshops, have been constructed on a mistaken idea that whatever shuts out air, heat and cold is conducive to health. The large death rate from consumption really must be ascribed in a great measure to bad ventilation in home and workshop.

The last scene of conflict in tuberculosis between the victim and his foe is the house. Tuberculosis develops into consumption because of the house. This does not mean that people could not get tuberculosis if they lived out of doors, for birds of the air and animals of the field get the disease. Tuberculosis, however, in

itself would seldom prove fatal. Both animals and human beings may go through life with tuberculosis and reach old age without being seriously inconvenienced by it. Lots of animals and people do. Dr. Trudeau has shown by experiments on animals that life in the open air greatly retards the development of tuberculosis and promotes recovery. Rabbits which he inoculated and penned up died, while rabbits which he inoculated and permitted to run at large maintained good health, although they developed tuberculosis. In sanitoria where consumptives are made to live out of doors wonderful improvement sets in, even when the case is incurable. Frequently all the symptoms of consumption disappear, and the patient becomes comfortable even when so much tissue has been destroyed that recovery is physically impossible. In other words, even consumption in the open air loses all its most serious symptoms. The house makes and maintains consumption, and consumption kills.

Consumption may be well termed a house disease. Without the house it cannot exist. It depends upon the house for its implantation, propagation, and for evolution of all its phenomena. The house is the place where the tubercle bacillus lies dormant in wait for its host; it is the place where the new host gets his implantation; it is the place where the tubercular subject gradually becomes a consumptive, and it is the place where the consumptive dies.

In studying the progress of civilization in the light of modern science one is struck with the egregious blunders into which man has been led by his desire for privacy and comfort. He has built his house to keep out his enemies, to protect himself from heat and cold, and to screen himself from the curiosity of his neighbor. He has sought to make his home his castle, but in reality he has made it the place wherein he courts death.

If man desires to free himself from the great white plague, he will have to retrace his steps from some of what he considers advanced points of civilization. He will have to learn, among other things, that fresh air is God's greatest gift on earth, and that whatever shuts out fresh air shuts out health and happiness. In house infection he will find the key to the entire problem of stamping out tuberculosis.

SUMMARY:

1.—Tuberculosis is a disease due to the parasitic growth of a micro-organism on the tissues of a human being or animal. Being *due to* organic life, it is communicable.

2.—Tuberculosis is contagious. The contagion of tuberculosis is different from the contagion of acute contagious diseases, however. It is slow and can be avoided easily in the presence of a consumptive, while that of acutely contagious diseases is rapid and cannot be avoided in the presence of those who have such diseases.

3.—The contagion of tuberculosis is closely associated with the house. An inclosure of some kind is necessary to make it effective.

4.—The house is the granary of the tubercle bacillus. It is the place in which tuberculous matter is kept vital until the bacillus can find a new host.

5.—Out of doors tubercular matter becomes devitalized in a short time through water, light and air. Enough cannot accumulate in a vital state to create a contagious environment.

6.—Everyone has some resisting power to tuberculosis. Some have more than others. Practically all have sufficient resisting power to withstand occasional exposure to tuberculosis and exposure out of doors.

7.—For an implantation of tuberculosis prolonged intimate exposure and an intensely contagious environment is necessary to overcome resisting power. This is had in the home and the workshop.

8.—The house prepares soil for the tubercle bacillus.

DEAD OUT OF DOORS.

High from the ground, and blown upon by air
  Sun-sanctified; caught from corruption's mould,
Girdled by streams amidst the foot-hills fair,
  With wind-chants making music sweet and old,

This red man rests: unto the elements
  He doth return; his soul soars glad and free,
And e'en his body seems, in going hence,
  To cry: "Oh, Grave, where is thy victory!"

—Richard Burton, in the March "Atlantic."

SOME PROBLEMS OF A GREAT CITY.

ORATION AT THE ANNUAL MEETING OF THE ORLEANS PARISH MEDICAL SOCIETY, NEW ORLEANS, JANUARY 9, 1904.

By the REV. BEVERLY WARNER.

The honor of addressing your society is very sincerely appreciated and the opportunity is one of which I am at the present time especially eager to avail myself. The city in which our lot is cast and where the bulk of our work is done, is trembling on the verge of a larger and more important forward movement along all lines than ever before in its history.

Louisiana's first offering to civilization was the products of her soil. Her second was the handling of these products as raw material through her exchanges and commercial houses. In the third act of this drama of progress our commonwealth is seen transferring the raw material into the finished product within her own limits and out of her own resources. In other words, native industrialism is beginning to supplement our commerce, and to give greater value to our agriculture.

The construction of the great water way across the Isthmus of Panama forces New Orleans to the front rank among the ports of the world. Southwestward the course of empire takes its way.

The city is the great throbbing heart of this larger life. The city, as characterized by a recent writer, with its "crowded, surging, sorrowing, suffering populace; its great teeming multitudes, its burdens of hope and fear; its disappointments and vexations; its weariness, its sins, its loneliness and heartbreaks; its burden of humanity."

It is upon this phase of the great city life, and concerning some of the desperate problems it presents, that I venture to address you this evening.

There is no body of men who have such expert knowledge as you possess of the "seamy side," so called, of the city's life.

Special knowledge like special talent involves responsibility. It may not always be possible for those who possess such knowledge to put it to practical account themselves, but then it becomes their duty to place it at the disposal of those who are able to use it for the general good.

Two foes to progress are in full fighting force in this community as in others. Ignorance and a smug conservatism which might be given a harsher title without doing violence to the facts. There is also another element which complicates the problem of the better life of the city. It is that false idea of civic patriotism which considers loyalty in the exploitation of unpleasant truths to be treason to the commonwealth.

Now, the physician's calling lifts him above any possible suspicion of self-interest in the use of the probe; and as he is bound in the course of his professional tasks and toil to become acquainted with the details of these evils which affect the moral and physical well-being of the city, I urge upon him his duty as a citizen to at least cry aloud what he knows.

I beg therefore to recall to you certain conditions with which your organization might deal, or concerning which individually you might assume the office of the old Hebrew prophets to cry aloud and spare not. I speak of those serious conditions which menace the health and tend to sap the morals of a large portion of our population.

There is first the threat of crowded tenements. This may surprise laymen, but it will not surprise you. We call our city the delightful city, a city of gardens, of wide spaces between dwellings, through which and over which sweep fresh breezes. In some parts of the city this is true enough. And in those portions there has arisen an impression that there are no slums in New Orleans. People argue that because houses are not crowded together, there is no crowding. The difference between New York and Chicago and New Orleans is that they build up unto the air, while we sprawl out upon the ground. If there be an advantage on either side, it rests with those who dwell in the upper air over those who live on the damp soil of these latitudes.

During the recent convention of the American Economic Association in this city, certain gentlemen acquainted by personal observation and experience with the slum conditions of Northern and Eastern cities assured me that some of the neighborhoods which they investigated here equaled in unsanitary terror those which existed in the larger centres of population. This is an expert opinion, which upon communicating to physicians of my acquaintance, they responded that they knew it, and in some cases added far more sickening details than had fallen under the eyes of the visitors.

We expect men to crowd together, man being a gregarious

animal. It is an old evil coincident with the building of cities. It has moreover always been recognized to be an evil. A proclamation of Charles I "prohibited the sub-division of any building into tenements . . . and the receiving of more families than one into a single tenement."

Cromwell and Charles II are credited with like prohibitions. The reason given was, in substance, that too great a population could not be assembled in one centre without scarcity of food, and lack of proper care for the poor, the sickly, and the starving.

But if people desire to herd together in droves, rather than dwell apart in families, why should they not be allowed to have their way? As moralists we might argue how far it is permissible to a democracy to allow people to live under conditions which evilly affect only themselves; but as citizens, there is no room for argument. We protect by our laws children and even animals from the cruelty or neglect of those who have legal authority over them. We do this in the interest of the State, which, for its own weal must preserve its citizenship from becoming weakling and inefficient. In the same interest we declare that when men herd to the detriment of themselves and others, the whole being of society is affected, and society has the right both of protest and of regulation.

With the overcrowding of our tenements arise noisome and unsanitary modes of living. I am credibly informed by those whose eyes have beheld what they describe that in some crowded portions of this city the lack of a proper disposition of fecal matter is a constant breeder of disease.

The surgeon and physician are forced to fight not only the wounds and ills of humanity running their normal course, but both visible and invisible enemies to health and restoration which inhere in the filthy environments of the very poor.

Moses brought to bear the mandates of religion to preserve hygienic conditions. Moses may or may not be your prophet, but the religion of humanity claims you as her priest, and in the forefront of your law must be this sentence, "Thou shalt, O man, be clean, not only to be worthy of, but to preserve the sacred dower of human life."

The physician has handicap enough in the ignorance and perverseness of his patients. He has the right to demand that society should not set the broad seal of approval upon this ignorance and perverseness, by declining the responsibility of that age-old law of human intercourse, "we are our brother's keeper."

The coming of the trained nurse has been of great advantage in the improvement of certain conditions. But the masses who most need this superb addition to the staff of modern organized helpfulness are unable for lack of money to avail themselves of it.

One of the problems of the great growing city, spotted with festering heaps of impotent wretchedness, is that of bringing together this trained ministry and those who need their ministration.

And this without the taint of pauperization.

One tendency of our civilization, with all its material possessions, and abounding in the rude vigor of power to do, is to overdo. I am not sure but that we have overdone in the matter of charitable organizations and institutions. We have many organizations, and too little organization.

I am afraid we have taken it too much for granted that the chief task of charitable administration is cure, rather than the more difficult but surely more rational one of prevention.

We need a philanthropic serum injected in the social body to obviate the necessity of free clinics for the million, and hospitals for the cure of preventable disease.

Apropos of which, you will not accuse me of trespassing too far upon your own preserves, if I note two curious things in connection with the modern hospitals, or rather with the view taken of them by the lay public.

First, is a real and genuine fear of the hospital and its treatment on the part of many poor and suffering people. They dread to put themselves in your hands, gentlemen, beyonds the walls of their own homes. There is an absurd side to this and a pathetic one. Superstition has something to do with it, ignorance, misinformation—all crystallizing into a not uncommon sentiment that hospital patients are used to experiment upon. Time, patience, spelled with a c, experience, will gradually overcome this. Meanwhile it should be the duty and the high privilege of those who, like myself, have almost daily opportunity of watching the physician bending over the sick-bed of the humblest and poorest, to bear our testimony to his most loyal services in his most holy calling, irrespective of the poverty or wealth, the race or condition, of his patient.

Not excepting my own profession, where we expect to find unselfish service, there is no work done in this world, in my judgment, with such absolute faithfulness, with such indomitable per-

severance, and amidst the most difficult conditions, with such beautiful optimism, as the work of the average surgeon and physician to the bodies of men. Above most men, he must be a man of honor, for the secrets of many hearts, as well as bodies, are bare to his gaze. He must be a man of sympathetic feeling, for he deals with the human at his very worst, tortured by pain, and heavy-souled at the prospect of grappling with the mystery of death.

For twenty-five years I have met him among all sorts and conditions of men, carrying on his often hopeless struggle, but always with hope in his soul. For twenty-five years it has been my fortune to find him almost invariably as I have described him, with exceptions so rare as to sink into insignificance.

The other curious attitude of the public towards the free hospital is the ungenerous use of its facilities by those who are able to pay for their treatment. This is more than mere selfishness; it is an overt wrong, both against the sick poor, who are thus deprived of their rights, and against the profession, without whose free and voluntary labor hospitals would be impossible for the really needy, and misery suffering would be vastly increased.

But this is a digression.

The other vital problem concerning which the voice of the medical profession should be raised is that of the employment of children of tender age in mills and factories. With the growing industrialism of the South follows the engagement of children for the meagre wage that could not be offered to men and women, at an age when such use of their bodies becomes a menace to manhood and womanhood.

It is not with the employer of such labor that the blame wholly lies. Parents coin tainted silver from the blood and tears of their own offspring. Falsehood, cunning, and deceit are their environment as the results of legislation that would save them to a better man and womanhood, under the pressure of the parental greed or imagined necessity.

The physician knows, as no one else, the moral and physical effect of the confining labor in factories upon the young, not only in the stunting and arresting of their youth, but in the sapping of their manhood and vigor.

> "They know the grief of man without its wisdom;
> They sink in man's despair without its calm."

I urge you who see the travail of the childish souls to voice their childish wrongs.

Those who take upon themselves these tasks: the obstinacy of vested interests, the opposition of the ignorant, the dislike of that complacent citizenship which prefers the dishonorable peace of acquiescence to the knightly tumult of revolt.

I remember, not so long ago, how one summer physicians were roughly blamed for not reporting cases of an infectious disease, and the next summer every pressure was brought to bear upon them by reputable citizens to force them not to report them. The business interests of the city, it was claimed, were at stake.

My friends, publicity is the most potent factor in the process of reformation. If this city, or any part of this city, nurses conditions which are a menace and a threat to the public welfare, I believe it is the solemn duty of those under whose observation these evils fall to invite the name of traitors, by loyalty to a deeper than the surface truth.

I do not depreciate the efforts that are made. I acknowledge the painful lack of money in the public chest to accomplish more for the better sanitary conditions. I admit the low death rate at certain seasons of the year, compared with other cities of like size. But I protest that a city than can so graciously entertain the world, at such large cost every year, should be summoned to consider whether, having done that, there are not other things of at least equal importance which should not be left undone.

We should have a tenement house commission at least to regulate the building, remodeling and occupancy of dwellings, where the very poor have no choice but to live. Will you ask for it?

The time will come when in New Orleans, as elsewhere, men and women will be inspired to give their wealth for the prevention of misery and wretchedness, as they now give generously for their amelioration.

We are seeing the beginnings of it. It will come, that happy day, when men will know what they deny or doubt, or fear to have brought to their notice.

You, gentlemen, are busy and hard-worked men, but can speak with unquestioned authority, and with motives that cannot be impugned, concerning these problems which increase with population and multiply with the expanding industrialism to which we point with pride.

You must be staggered often under your consciousness of the burden of humanity.

See, through the rocks of the world
Marches the host of mankind,
A feeble wavering line.
Where are they tending? a God
Marshaled them, gave them their goal.
Ah! but the way is so long!
Years they have been in the wild!
Sore thirst plagues them, the rocks
Rising all round, overawe;
Factions divide them, their host
Threatens to break, to dissolve.
Ah! keep, keep them combined
Else of the myriads who fill
That army, not one shall arrive.
Sole they shall stray; in the rocks
Stagger forever in vain;
Die, one by one, in the waste.

But I know of no organized body of men so competent as this, speaking from their first hand knowledge, without rhetoric, without bombast, to arouse the civic conscience to a civic consciousness of duty. For

Languor is not in your heart,
Weakness is not in your word,
Weariness not on your brow.
Ye alight in our van, at your voice
Panic, despair flee away.
Ye move through the ranks, recall
The stragglers, refresh the outworn,
Praise, reinspire the brave!
Order, courage, return,
Eyes rekindling, and prayers
Follow your steps as ye go.
Ye fill up the gaps in our files
Strengthen the wavering line.
'Stablish, continue our march.
On to the bound of the waste,
On to the city of God.

—From New Orleans "Medical and Surgical **Journal," March,** 1904.

BILL FOR PREVENTING THE ADULTERATION OR MISBRANDING OF FOODS OR DRUGS.*

Be it enacted, etc., That the introduction into any State or Territory or the District of Columbia from any other State or Territory or the District of Columbia, or from any foreign country, or shipment to any foreign country of any article of food or drugs which is adulterated or misbranded within the meaning of this act is hereby prohibited; and any person who shall ship or deliver for shipment from any State or Territory or the District of Columbia to any other State or Territory or the District of Columbia, or to a foreign country, or who shall receive in any State or Territory or the District of Columbia from any other State or Territory or the District of Columbia or foreign country, or who, having received, shall deliver in original unbroken packages for pay or otherwise, or offer to deliver to any other person any such article so adulterated or misbranded within the meaning of this act, or any person who shall sell or offer for sale in the District of Columbia or the Territories of the United States such adulterated or misbranded foods or drugs, or who shall export or offer to export the same to any foreign country shall be guilty of a misdemeanor, and for such offence be fined not exceeding two hundred dollars for the first offence, and for each subsequent offence not exceeding three hundred dollars, or be imprisoned not exceeding one year, or both, in the discretion of the court.

SEC. 2.—That the Chief of the Bureau of Chemistry in the Department of Agriculture shall make or cause to be made, under rules and regulations to be prescribed by the Secretary of Agriculture, examinations of specimens of foods and drugs offered for sale in original unbroken packages in the District of Columbia, in any Territory, or in any State other than that in which they shall have been respectively manufacturered or produced, or from any foreign country, or intended for shipment to any foreign country, which may be collected from time to time in various parts of the country. If it shall appear from any such examination that

*"Bill (S. 198) for preventing the adulteration, misbranding, and imitation of foods, beverages, candies, drugs, and condiments in the District of Columbia and the Territories, and for regulating interstate traffic therein, and for other purposes, and the bill (H. R. 6295) for preventing the adulteration or misbranding of foods or drugs, and for regulating traffic therein, and for other purposes."—Passed the House of Representatives January 19, 1904, and is at the time of this writing in the Senate.

any of the provisions of this Act have been violated, the Secretary of Agriculture shall at once certify the facts to the proper United States Dictrict-Attorney, with a copy of the results of the analyses, duly authenticated by the analyst under oath.

SEC. 3.—That it shall be the duty of every district-attorney to whom the Secretary of Agriculture shall report any violation of this Act to cause proceedings to be commenced and prosecuted without delay for the fines and penalties in such case provided.

DEFINITIONS.

SEC. 4.—That the term "drug," as used in this Act, shall include all medicines and preparations recognized in the United States Pharmacopœia for internal and external use; also any substance intended to be used for the cure, mitigation, or prevention of disease. The term "food," as used herein, shall include all articles used for food, drink, confectionery, or condiment by man or domestic animals, whether simple, mixed, or compound.

ADULTERATIONS AND MISBRANDING.

SEC. 5.—That for the purposes of this Act an article shall be deemed to be adulterated—

In case of drugs:

First. If, when a drug is sold under or by a name recognized in the United States Pharmacopœia, it differs from the standard of strength, quality, or purity as determined by the test laid down in the United States Pharmacopœia official at the time of the investigation: *Provided*, That no drug shall be deemed to be adulterated under this provision if the standard of strength, quality, or purity be plainly stated upon the bottle, box, or other container thereof, although such standard may differ from that determined by the test laid down in the United States Pharmacopœia.

Second. If its strength or purity fall below the professed standard under which it is sold.

That such drug shall be deemed to be misbranded:

First. If it be an imitation of or offered for sale under the name of another article.

Second. If the package containing it or its label shall bear any statement regarding the ingredients or the substances contained therein, which statement shall be false or misleading in any particular, or if the same is falsely branded as to the State or Territory in which it is manufactured or produced.

In the case of confectionery an article shall be deemed to be adulterated:

If it contains terra alba, barytes, talc, chrome yellow, or other mineral substances or poisonous colors or flavors, or other ingredients deleterious or detrimental to health.

In the case of food an article shall be deemed to be adulterated:

First. If any substance or substances has or have been mixed and packed with it so as to reduce or lower or injuriously affect its quality or strength, so that such product, when offered for sale, shall deceive or tend to deceive the purchaser.

Second. If any substance or substances has or have been substituted wholly or in part for the article, so that the product, when sold or offered for sale, shall deceive or tend to deceive the purchaser.

Third. If any valuable constituent of the article has been wholly or in part abstracted, so that the product, when sold or offered for sale, shall deceive or tend to deceive the purchaser.

Fourth. If it contain any added poisonous ingredient or any ingredient which may render such article injurious to the health of the person consuming it.

Fifth. If it consists in whole or in part of a filthy, decomposed, or putrid animal or vegetable substance, or any portion of an animal unfit for food, whether manufactured or not, or if it is the product of a diseased animal, or one that has died otherwise than by slaughter.

An article of food shall be deemed to be misbranded:

First. If it be an imitation of or offered for sale under the distinctive name of another article: *Provided,* That the term "distinctive name" shall not be construed as applying to any article sold or offered for sale under a name that has come into general use to indicate the class or kind of the article if the name be accompanied on the same label or brand with a statement of the place where said article has been manufactured or produced.

Second. If it be mixed, colored, powdered, or stained in a manner whereby damage or inferiority is concealed, so that such product, when sold or offered for sale, shall deceive or tend to deceive the purchaser.

Third. If it be labeled or branded with intent so as to deceive or mislead the purchaser, or purport to be a foreign product when not so, or is an imitation, either in package or label, of another substance of a previously established name, or which has been trade-marked or patented.

Fourth. If the package containing it or its label shall bear any statement regarding the ingredients or the substances contained therein, which statement shall be false or misleading in any particular, or if the same is falsely branded as to the State or Territory in which it is manufactured or produced: *Provided*, That an article of food which does not contain any added poisonous or deleterious ingredients shall not be deemed to be adulterated or misbranded in the following cases:

First. In the case of mixtures or compounds which may be now or from time to time hereafter known as articles of food, under their own distinctive names, and not included in definition first of misbranded articles of food in this section.

Second. In the case of articles labeled, branded, or tagged so as to plainly indicate that they are mixtures, compounds, combinations, imitations, or blends: *Provided*, That the same shall be labeled, branded, or tagged so as to show the character and constituents thereof: *And provided further*, That nothing in this Act shall be construed as requiring or compelling proprietors or manufacturers of proprietary foods which contain no unwholesome added ingredients to disclose their trade formulas, except in so far as the provisions of this Act may require to secure freedom from adulteration or imitation: *Provided further*, That no dealer shall be convicted under the provisions of this Act when he can establish a guaranty signed by the wholesaler, jobber, manufacturer, or other party from whom he purchases such articles to the effect that the same is not adulterated or misbranded within the meaning of this Act, designating it, and providing further, always, that said guarantor or guarantors reside in the United States. Said guaranty, to afford protection, shall contain the name and address of the party or parties making the sale of such article to such dealer, and said party or parties shall be amenable to the prosecutions, fines, and other penalties which would attach, in due course, to the dealer under the provisions of this Act.

SEC. 6. That every person who manufactures or produces for shipment and delivers for transportation within the District of Columbia or any Territory, or who manufactures or produces for shipment or delivers for transportation from any State, Territory, or the District of Columbia to any other State, Territory, or the District of Columbia, or to any foreign country, any drug or article of food, and every person who exposes for sale or delivers to a purchaser in the District of Columbia or any Territory any

drug or article of food manufactured or produced within said District of Columbia or any Territory, or who exposes for sale or delivers for shipment any drug or article of food received from a State, Territory, or the District of Columbia other than the State, Territory, or the District of Columbia in which he exposes for sale or delivers such drug or article of food, or from any foreign country, shall furnish within business hours, and upon tender and full payment of the selling price, a sample of such drugs or articles of food to any person duly authorized by the Secretary of Agriculture to receive the same and who shall apply to such manufacturer, producer, or vender, or person delivering to a purchaser such drug or article of food, for such sample for such use, in sufficient quantity for the analysis of any such article or articles in his possession.

SEC. 7.—That any manufacturer, producer, or dealer who refuses to comply, upon demand, with the requirements of section eight of this Act shall be guilty of a misdemeanor, and upon conviction shall be fined not exceeding one hundred dollars or imprisonment not exceeding one hundred days, or both. And any person found guilty of manufacturing or offering for sale, or selling, any adulterated, impure, or misbranded article of food or drug in violation of the provisions of this Act shall be adjudged to pay, in addition to the penalties hereinbefore provided for, all the necessary costs and expenses incurred in inspecting and analyzing such adulterated articles which said person may have been found guilty of manufacturing, selling, or offering for sale.

SEC. 8.—That any article of food or drug that is adulterated or misbranded within the meaning of this Act, and is transported or being transported from one State to another for sale, or if it be sold or offered for sale in the District of Columbia and the Territories of the United States, or if it be imported from a foreign country for sale, or if intended for export to a foreign country, shall be liable to be proceeded against in any district court of the United States, within the district where the same is found and seized for confiscation, by a process of libel for condemnation. And if such article is condemned as being adulterated the same shall be disposed of as the said court may direct, and the proceeds thereof, if sold, less the legal costs and charges, shall be paid into the Treasury of the United States, but such goods shall not be sold in any State contrary to the laws of that State. The proceedings of such libel cases shall conform, as near as may be, to proceedings in admiralty, except that either party may demand

trial by jury of any issue of fact joined in such case; and all such proceedings shall be at the suit of and in the name of the United States.

SEC. 9.—That this Act shall not be construed to interfere with commerce wholly internal in any State, nor with the exercise of their police powers by the several States: *Provided further*, That nothing in this Act shall be construed to interfere with legislation now in force, enacted either by Congress for the District of Columbia or by the Territorial legislatures for the several Territories, regulating commerce in adulterated foods and drugs within the District of Columbia and the several Territories, except wherein such legislation conflicts with the provisions herein.

SEC. 10.—That this Act shall take effect and be in force from and after the first day of January, nineteen hundred and five.

THE OLD TIME PIECES, AND HOW I TAKE CARE OF THEM.

You are right, my dear young house-wife, it is much easier to care for old silver pieces than old mahogany pieces. They are the most trouble of all such relics, is my experience.

I will tell you an excellent method of caring for your valuable old sideboard and dining-table; for unless they are cared for properly they will soon lose all their look of grandeur.

I have had considerable experience with such pieces, and it is the most difficult of all I ever cleaned; yet with patience and care it can be kept perfectly.

Your dining-table and sideboard should be wiped off every day until they reflect like a mirror. If an ink-stain gets on your table, remove it with a few drops of spirits of niter in a spoonful of warm water. Put one drop on the ink, and rub at once with a soft woolen cloth; not with water, or it will make a white spot. You should not let any one write on such a table.

Wipe your dining-table with a clean flannel dipped in a warm (not hot) suds made of rain water and pearline, and then with a thick flannel wad pour melted wax until it forms a glazed surface when cold, and rub the table hard, following the grain of wood, until you can see your face in it. All of your mahogany pieces can be cleaned beautifully this way.—S. H., in "The Living Church."

MEDICAL EXCERPT.

By T. P. Corbally, A.M., M.D.

The Cure of Biliary Lithiasis by Chologene.—The following notice of a most important subject by Dr. Gaudin appeared in the "Progrès Médical" of March 3d, who says, under the title "Thérapeutique":

"According to theories now popular on the subject of pathology it is believed that everything has been explained when 'infection' was given to the profession. Biliary lithiasis has not escaped this interpretation; according to the new doctrine biliary lithiasis is due to an infection having its origin in the intestines. The rational therapeutic treatment in the case would then be to disinfect the intestines and the biliary tracts by proper remedies, as the Carlsbad water, or by purgatives, as calomel, and if that is not sufficient, by operation."

Dr. Glaser, de Muri, has remarked very justly that the pathogenic relations arising from disturbances in the nervous system have been quite too much neglected. He has formulated a new treatment for hepatic colics, based on the following theory:

Normal bile is sterile. It is a product of secretion submitted to the influence of the nervous system, as are all the secretions. Normal bile, yellow, limpid, sterile, ought to contain all the elements in normal proportions. It is not so secreted by the liver except when the pneumo-gastric and the sympathetic excite the parenchyma of the liver under normal conditions. The proper proportion of the cholesteric salts and the cholesterine are important, and should be maintained. As soon as the proper proportion of the acids of the bile and the cholesterine in their proportions, the bile becomes irritating to the liver; it becomes subject to infection, or it infects the biliary conduits. However short the time it may remain stagnant in the liver, a condition that happens usually in the night, it will depose a large quantity of cholesterine in excess of health, and crystals are formed, usually around a centre of epithelial cells in process of elimination. The bile thus changed will offer less resistance than the normal bile to the infection that may enter through the duodenum. This infection may have, as a consequence, a decomposition of the bile, and may also form a deposit of cholesterine. When the biliary

calculi are formed they act like all other foreign bodies by provoking irritation of the catarrhal surfaces of the biliary passages, and if there is a possibility, an infection of some kind will result.

The most important question is then, first to influence the nerves of secretion of the liver so as to restore it to its healthy action, and thus to render the bile secretæ natural and healthy. A perfect remedy ought to restore the normal and healthy condition of the elements of the bile without, however, making it too thick.

It will be necessary also that this medicine pass into the bile itself, in order to have the power to exert an antiseptic effect; its action must be anti-catarrhal on the lining of the vessels. And more, this medicine must cause local hyperesthesia to disappear and calm the irritation and contractions of the vesicle, overcome habitual constipation, and do all this without producing any injurious effect, even if the remedy has to be employed for an indefinitely long time. But there is no substance, no drug which of itself would produce this multiple action and would agree with all persons.

Dr. Glaser has been led to prepare an organic derivative of mercury, uniting in itself the properties of cathartic agents, as cholagogues and of antispasmodic carminatives: this is an amylo-camphorate of mercury prepared under the form of compresses of three degrees of strength, which he calls chologène No. 1, No. 2, and No. 3. The treatment of biliary lithiasis must continue long enough to ensure success, and that condition should continue to exist even when a marked improvement should be found in a short time. It will be necessary to continue the administration of chologène often during six weeks, and the curative measures should be repeated every year during the spring and autumn.

It was only in very rare cases that Dr. Glaser was obliged to use morphine; a flannel bandage, moistened with oil of poppy and chloroform, was sufficient to calm the attacks when they were beginning.

The following are the principal lines on which treatment with chologène are conducted:

1. The patient must be withdrawn as much as possible from his usual habits and from the cares of business.

2. Exercise in the open air with deep breathing frequently repeated have a very favorable influence on the functions of all the organs, and especially on those associated with the liver. A perfect circulation of the blood throughout the system and deep

breathing stimulate the formation of the bile and its normal secretion.

3. The regimen should be very strict from the beginning of the treatment and continue as long as there is inflammation in the interior organs and around the biliary organs, and especially the liver. Indigested meats must not be used, but it is necessary not to allow the patient to become enfeebled by insufficient diet. A mixed diet is the best. A good mastication and a liberal amount of saliva are the principal things.

4. Baths, especially salt baths, are an important means of enlivening the activity of the hepatic functions.

5. The pains, the dragging sensations caused by adhesions or by other intestinal disturbances, such as dilatations of the stomach, must be treated with appropriate remedies. As far as possible should be spared local treatment, injections, electricity, massage.

In one hundred patients having biliary lithiasis treated with chologène, the present statistics show: Cured, 78 per cent.; improved, 16 per cent.; no results, 6 per cent.

For the use of chologène there are no contraindications whatever. All patients support it well—infants and the aged, those with heart disease, and women enceinte. In cases of catarrh of the large intestine the tablets of chologène may cause some griping pains without, however, increasing the catarrhal symptoms and without losing any of their curative value. Chologène may be prescribed from the moment that lithiasis has been diagnosed. It may also be used in doubtful cases or in those in which one may have to deal with critical nervous diseases of the stomach. The treatment will always be efficacious if it is well directed, if there be no empyema—no purulent infection of the biliary vessels, if there be no extensive adhesions, no malignant tumors.

This is followed by a series of interesting cases by the author, for which room cannot be spared.

CHLORIDE OF SODIUM IN GASTRIC DIGESTION.—Linassier presented a report to the Société de Biologie on the action of chloride of sodium on gastric digestion in dyspeptics ("Progrès Médical," Jan. 30, 1904). The effect of the ingestion of sea salt is first to diminish the hydrochloric acidity of the gastric contents. Reichmann has formally established this in man. The chlorurisation of the organism augments the secretion of hydrochloric acid in

the dog; in man it is hypohydrochloric. The suppression of the alimentary chlorides may lead to the arrest of all gastric secretion. In the hyperhydrochloric the limitation of the alimentary chlorides produce in the general secretion only modifications of little importance. The same results might be obtained by a hyperhydrochlorurisation intense and protracted.

The chloride of sodium retards the pepsic digestion of albumen 0.3 pour 100 de sel act on the gastric contents as much as 40 or 50 per 100 of pepsine. The normal dose after an ordinary meal is an obstacle to digestion. So with the hypo-hydrochlorics, if there is occasion to add the salt, it ought to be introduced before the meal and in the form of an injection.

DENSITY OF THE BLOOD DURING THE LAST MONTHS OF PREGNANCY.—MM. P. Bar and Daunay have studied the cases of (5) five women in the last months of pregnancy whose health was good throughout; they also followed the cases of these same women for many months after their confinement. This was done by puncture of the cephalic vein, and the density was determined by means of a pipette of their own construction. The density of the blood was in all the cases diminished at the end of pregnancy. It was on average 1051, and speedily raised in women who did not nurse. It was much lower in rising, and always less in quantity in nurses, and generally a marked and distinct change was observed ten days after nursing was discontinued.

AN EFFICIENT ANTISEPTIC.—The general results of the recent discussion in this paper ("London Daily Chronicle") on the relative value and safety of various antiseptics derive confirmation from a monograph which we have received from the Pasteur Institute of Paris. We described the volatile or essential oils of plants as the safest—and the most pleasant, might have been added—of antiseptics for direct human use; that of eucalyptus holding a very high place. A couple of professorial members of the Association of Analytical Chemists of the Pasteur Institute have been studying listerine, which is named after the great English surgeon. Listerine is a mixture of the essential oils of thyme, eucalyptus, baptisia, wintergreen and mint. It has relatively non-toxic properties peculiar to these oils, but the Parisian savants have brought out the important fact that the mixture of oils is much more potent than any one of them singly. It attacks more than one joint in the bacterial armor. Carbolic acid—used so

much mainly because it is the original antiseptic employed by Lister—is 146 times as toxic as Listerine.

DISPENSARIES FOR DRUNKARDS.—Rybakoff ("Roussky Vratch," Jan. 24, 1904), advocates the establishment of municipal dispensaries for the prevention and treatment of alcoholism. In these establishments hypnotic suggestion should be employed as the principal method of treatment. The first establishment of this kind was founded by the author, in 1896, in connection with the Moscow Psychiatric Clinic, and since then several dispensaries of the same class have been opened in various parts of Russia. Rybakoff thinks that the entire country should be divided into districts, in each of which there should be one or more of these dispensaries.

The organization of these dispensaries should be undertaken by physicians in connection with national and local temperance societies. Such dispensaries should be also established as branches of municipal and rural hospitals. If a sufficient number of these dispensaries is opened, the question as to the establishment of special sanatoria for alcoholics will assume secondary importance. The author does not think that anything can be done with drugs in the treatment of chronic alcoholism, except symptomatically. The modern treatment of alcoholism reduces itself to one of two measures: Either the isolation of alcoholics in special sanatoria, or the systematic employment of hypnotism in ambulant cases.—"New York Medical Journal," April 2.

CARBURETED AIR LIGHT.—Dr. Hugh Marshall, Fellow of the Royal Society of Edinburgh, lecturer on chemistry in the University of Edinburgh, has invented another method of using carbureted air for lighting. It is an improvement upon the form of lamp devised by M. Naum Notkin, of Moscow, in which carbureted air was obtained by employing paper pulp saturated with gasoline to produce the vapor required. In this Notkin "gravity" lamp the carbureted air, being denser than air itself, flowed from a higher to a lower level, instead of ascending like coal gas, and could therefore be poured from one vessel to another, like a liquid. In the Marshall lamp the necessary current of air through the carbureter is not maintained by the effect of gravity, but by means of the draft from the lamp chimney. It is thus possible to have the body of the lamp below the actual burner. To reduce the manipulation necessary with such a lamp when used for incandescent lighting, Doctor Marshall has invented a form of burner

tube, which is sunk axially into the body of the containing vessel, and which enables the user to regulate the mixture of vapor and air to a nicety by simply rotating the tube in one direction or the other. The new method of using carbureted air has been applied by Doctor Marshall to various types of lamps—table and portable, hanging, basket, and also in lantern form for outdoor lighting. These show a brilliant incandescent light, without any liquid or wicks being used, and are free from smell or smoke. Doctor Marshall claims also that carbureted air can be supplied all over a house without danger or complicated processes, and that the gas can be applied to other purposes than lighting, such as for heating and motive power.—Rufus Fleming, Consul, Edinburgh, Scotland, November 25, 1903.

Popular Remedies for Drunkenness in Russia.—Demitch ("Roussky Vratch," Jan. 24, 1904) reviews the various methods which the Russian people employ in dealing with drunkenness. A variety of empirical and superstitious remedies are employed, for the most part substances which are so disgusting that they excite nausea and vomiting. A number of plants distinguished by their bitter taste, strong odor, and sometimes poisonous properties, have been used by the people in "curing" drunkards. Most of them are of no value but do a great deal of harm. As regards the methods of bringing a drunken man to consciousness, which are still in vogue in the rural districts of Russia, they are evidences of inhumanity which characterizes a low state of civilization. The idea of these methods is that a drunkard must be brought to his senses, no matter at what cost, and thus be cured of his pernicious habit. In one place the peasants cover the scrotum and perinæum with tar, and the resulting headache, lasting for a day or two, is supposed to "sober him up." In another town, ammonia is given to inhale, or the juice of fresh horses' fæces is given to drink. In the Tchernigoff province there is a tradition that a drunkard must be brought to by pouring fresh human urine into his mouth. In the Krasnoslobodsk district the peasants use a mixture of hens' excrement and woman's urine, and in Kaluga, Orloff, etc., they give drunkards the juice of horse manure. In another place they wash the head with hot water, or rub the ears with snow until they are terribly deformed. Other inhuman methods are used also, such as whipping with leather straps, throwing into the air upon blankets, holding by the feet with the head down, tearing out the hair or beard, etc., the

drunkard being passed from hand to hand with a view of "not allowing him to sleep." In one case a man was boiled to death by pouring a quantity of boiling water upon his naked body.—"New York Medical Journal," April 2.

RECENT SANITARY PATENTS.

746421.—Apparatus for Destroying Refuse; George Watson, Leeds, England.

746731.—Formaldehyde Fumigator; Seth M. Morris, Galveston, Tex.

746949.—Cesspool; Howard D. Gardner, New York, N. Y.

749453.—Attaching Device for Sanitary Napkins, Charles H. Schopbach, Aurora, Ill.

749963.—Apparatus for Applying Disinfectants to Water Closets; George S. Gallagher, New York, N. Y.

750347.—Apparatus for Disinfecting Paper Money; Charles B. Clark, Buffalo, N. Y.

750474.—Water Purification; Cleophas Monjeau, Middletown, Ohio.

750568.—Massage Implement; James Barker, Philadelphia, Pa.

750735.—Implement for Mechanical Vibratory Treatment; Fenton B. Turck, Chicago, Ill.

751266.—Pocket Spittoon; Joseph M. A. Deydier, Lyons, France.

752114.—Breath Guard; Leonidas Sennett and Abraham L Moore, Russell, Ky.

752657.—Fumigator; William B. Cunningham, Houston, Tex.

753968.—Device for Applying Liquids to the Scalp; Arthur J. Farmer, Detroit, Mich.

754463.—Massage Machine; Philip J. Kroll, New York, N. Y.

754890.—Device for Removing Garbage; Emil O. Poppe, Kirchberg, Germany.

754925.—Massage Device; Ottoman Zar-Adusht-Hanish, Chicago, Ill.

754992.—Exercising Apparatus; Charles A. Grabner, Warsaw, Ind.

755547.—Combined Body Brace and Corset; Howard C. Rash, Celina, Kansas.

EDITOR'S TABLE.

SANITARIAN, MAY, 1904.

All Communications, business and otherwise, all exchanges and all publications for review should be addressed to the Editor, Dr. A. N. Bell, 337 Clinton Street, Brooklyn, N. Y.

CHILD-SAVING LAWS SUSTAINED.

An opinion sustaining the New York law will keenly interest those who have been promoting child-labor campaigns in other States.

JUDGE ROESCH, of the Fourth District Municipal Court, New York City, handed down on March 24th a decision in what is considered the most important case so far brought into the courts as result of the efforts that the Child-labor Committee is now making to secure a thorough enforcement of the child-labor and compulsory education laws which were passed by the New York Legislature last winter, and which put New York in the forefront of child-protecting States.

The constitutionality of the law is upheld and the judge makes a ruling which, if sustained, will practically put an end to the usefulness of perjured affidavits which in years past have been notoriously common in procuring the employment of children too young to be allowed to work.

The case was an action brought by the City of New York against the Chelsea Jute Mills, a large Brooklyn corporation employing many women and children, to recover a penalty of fifty dollars for a violation of the compulsory education law. This law, which was substantially amended as a part of the Child-labor Committee's work of last year, provides that an employer who employs a child under fourteen years of age during any part of the term in which schools of the district in which the child resides are in session shall be subject to a penalty of fifty dollars, recoverable by the city. The Chelsea Jute Mills employed a little Italian girl, eleven years old, named Annie Ventre, in emptying bobbins. When she was first employed, being then eleven years of age, she produced an affidavit by her father that she was sixteen years old. On trial the City of New York was represented by Assistant Corporation Counsel John C. Breckenridge; the Child-labor

Committee, whose investigations and evidence caused the suit to be brought, being represented by George W. Alger, who appeared by permission of court as counsel for the committee, and who submitted a brief of the law. The defendant, through Carter, Ledyard & Milburn, strenuously claimed not only that the compulsory education law was unconstitutional, but that the Chelsea Jute Mills, having acted in good faith and having relied upon the affidavit of the parent that Annie Ventre was sixteen, could not be punished for employing her. Their counsel insisted that the mills could not be punished unless it was shown that they knew the child's real age and intentionally violated the law.

Judge Roesch overrules this contention, holding that an employer who employs a child under fourteen years of age does so at his peril and cannot successfully plead that he does not know the child to be under the legal age.

"Nor is the good faith of defendant, or absence of intent, an excuse. The defendant was not active in its quest after the age of the child. It was passive. It complacently received the affidavit of the father upon that point. The forewoman testified that she made no other inquiries, but rested entirely upon the affidavit, and the statement of the girl that she was 'sixteen passed.' She was in court.

"To the most casual observer the very appearance of the child refuted her statement. When she made it she was but eleven years nine months old, and her daily toil dragged through ten and one-half hours. She showed the effects in her mal-development and stunted growth. She was a living picture of the result of child labor in a factory at a delicate age when womanhood and manhood are in a stage of development."

If this decision is sustained the use of these perjured affidavits which have in years past afforded so common a means to unscrupulous employers for evading the child-labor laws, will lose their value. Judge Roesch, in support of his opinion cites many cases sustaining his view that the company's alleged ignorance of the child's actual age is no defence; among them, a recent case in the Court of Appeals, in which it was held to be no defence in a criminal action against a liquor dealer for selling liquor to a minor, that the sale had been made in good faith after the minor had assured the liquor dealer that he was of age.

Judge Roesch sustains the constitutionality of the law, which was attacked as being "an unwarranted, illegal, and unconstitutional deprivation of the liberties of the defendant." The decision

contains a careful examination of the history of child-labor legislation in New York and elsewhere. Judge Roesch says: "The test with such legislation lies in its answer to the question, Does it serve a public purpose? Does it reach all persons of a reasonably ascertained class indiscriminately? And is it cognate to the objects it proposes to observe?" The justice finds that the present statute does not discriminate, is not arbitrary, and puts no unnecessary restriction on freedom of action, because he says: "It would be impossible, except by an absolute prohibition of employment of all children under fourteen years of age, to accomplish its beneficial ends. Nor does it constitute any improper infringement of any right a parent may have in a child in its labor or a child may have to labor."

The judge concludes that if this law be declared invalid the door will be thrown wide open to the most noxious kinds of child labor, and directs judgment for the plaintiff.

REAL LIFE DRAMA OF THE "TENDERLOIN"—A PATHETIC SCENE.

The New York "Times" of March 25 gives the following description of a little drama enacted in the West Thirtieth Street Police Station the night before:

A few minutes after midnight the door of the police station opened and there entered with a patrolman a young woman and an elderly man, both well dressed and of refined appearance. They were evidently Southerners. The girl was a prisoner.

"What is the trouble?" asked Sergt. Place. The patrolman shrugged his shoulders.

"This man came to me and asked me to step into a cafe at Thirty-first street and Broadway and take charge of this young lady."

Sergt. Place looked inquiringly at the elderly man. There was a long silence. Then the man said to the young woman, who was staring straight in front of her:

"Mary, it isn't too late. Will you come home?"

"No," was the firm reply.

"I am sorry," said the man to the sergeant, "but I must ask you, then, to—take charge of my niece for the night."

The sergeant said nothing; he was evidently anxious to allow the girl time to reconsider. The man turned again to the girl and said, huskily:

"For my brother's—your father's sake—Jim's dead and I'm your guardian—will you not come home?"

"No."

The man nodded to the sergeant and turned away.

"Your name, please?" said Place. The girl gave it, and her age as nineteen.

"The charge?"

"I will explain the situation," said the uncle. "Her father—my brother—is dead. Her mother has married again, and seems to have lost interest in the girl, who has been living with us. Recently she has been staying out late against my will. To-night I saw her enter the café with a young man whom I dislike. She refused to come home with me, and—I felt that—well, that's all."

The girl was placed in the hands of the matron. As the man turned to go, his niece said bitterly:

"You have committed your own niece to prison. Would you have done so had I been your daughter? Good night."

A few minutes later the door opened again and a young man entered.

"What has been done with Miss ———?" he inquired politely.

"Get out of here!" snapped the sergeant. The young man went.

At 1 o'clock the uncle returned.

"I wish to bail out my niece," he said brokenly.

"Certainly," said the sergeant. The security was doubtful, but it was accepted. The uncle went to the door and beckoned. An elderly woman entered, heavily veiled. Presently the young woman came in with the matron, who had evidently been crying. The girl signed her name to the bond; then she saw the veiled woman. Her composure gave way and she flung herself into the woman's arms with a sob.

"Mother!" was all she said.

There was dead silence in the Tenderloin station as the trio left it, but everybody stared thoughtfully at the door after it had closed upon that little drama.

SOAP.

The proposition to create a Democratic campaign fund for the next Presidential election from the sale of soap is novel, perhaps, but incongruous only because the principal use of campaign funds is for the benefit of the class of citizens who do not themselves use soap enough in four years to pay the costs of one good-sized demonstration. Voters who have more than a theoretical acquaintance with detergent preparations for toilet and

laundry are not, as a rule, those whose votes are influenced by even liberal expenditures of campaign funds. Those for whom the ways to the ballot box need to be lubricated by liberal applications of "soap," like the runners and guides of a badly-fitting bureau drawer, are such as admit of classification with "the great unwashed."

There may be an unappreciated touch of humor in the suggestion of Mayor Hinkle of Columbus, who wants to elect on a platform of soap a President "who is opposed to trusts and monopolies; a President who will practice after elected; a President who is in favor of public ownership of public utilities; a President who is in favor of equal taxation for all and special privileges to none; a President who is opposed to monarchies and empires; a President who is opposed to wars and extermination of liberty-loving people, whether in South Africa or elsewhere."

Those who would vote for a candidate acceptable to the people to whom this declaration of principles is satisfactory in its entirety would naturally expect a great deal of what in the vernacular of the heeler is known as soap. It is not likely, however, to be made from the fat fried out of the interests best capable of exuding oleaginous drippings at the relatively high temperatures of a political canvass. Therein the humor of the suggestion becomes obscure, and to enjoy the fun of it we must fall back upon the assumption that Mayor Hinkle intends his suggestion to be taken quite seriously. From that point of view it is highly mirth-provoking.

FIREPROOFING TEST A SUCCESS.

Inflammable Material After Treatment Would Not Burn.

Before representatives of the Fire, Building and Health Departments there was a public test recently of a new fire-proofing process by which theatrical scenery and effects, as well as other materials, may be rendered fire-proof for a period of years. The tests were made by Guido Blenio, the inventor of the process, at his laboratory and workrooms, at 545 West Twenty-second street. Deputy Superintendent John Jordan, of the Bureau of Buildings, accompanied by Engineer Schwartz of the same department, watched the tests for Superintendent Hopper, and said afterward that they would make a favorable report on the process.

During the tests samples of scenery, canvas used for scenery, gauze used for ballet costumes, lace curtains, mattresses, carpets, excelsior, newspapers, and other inflammable matter were subjected to the severest tests after having been saturated in the solu-

tion and then dried. By the use of a Benson blowpipe, flames capable of generating heat to 350 degrees were blown directly against the fire-proof materials. They were charred after being exposed from a minute and a half to three minutes, but did not burn.

THE PASSING OF THE CORONERS.

Ancient evils die hard. The demand for the abolition of the useless office of Coroner, which has no place in the present system of the administration of criminal law and serves no better purpose than to obstruct justice, has been emphatic for many years and has had the approval of public-spirited citizens and all interested in the administration of the laws for the ends for which they are designed. Bills to abolish this office have been offered year after year, but influences stronger than the will of the people or the public interest have been potent to kill them in committee. Stronger arguments than their advocates have employed have been used at Albany, and no doubt the Coroners had reached the opinion that they might say with the impious King Robert of Sicily, "there is no power can push me from my throne." But King Robert was mistaken. The bill abolishing the office of Coroner with the expiry of the terms of the present incumbents has passed the Legislature after the most determined efforts to defeat it, and the end of the system is in sight. All that the bill needed to commend it to unqualified approval is the clause, "This act shall take effect immediately." The omission treats the incumbents with unmerited consideration. It will be found in every way advantageous to divide the duties of the Coroners between the Police and the Health Departments, and their magisterial powers should vest in the justices of the police courts.

As it stands, the verdict of a Coroner's Jury counts for very little, and the action of a Coroner in fixing or absolving responsibility no longer governs the action of the District-Attorney nor influences that of the Grand Jury. Usually a farce, and often a scandal, Coroners' inquests have ceased to have any value, and the system of which they are a relic has been gradually relegated to the limbo of the obsolete in criminal jurisprudence. This, however, was not the chief objection to the continuance of the Coroners' office. The service has long been the refuge of incompetents, and some of the most active of the Coroners have been least fitted to render the public any useful and honest service. They burden the city with an annual pay roll of $145,000, and their expenses are between $50,000 and $60,000 more. The abo-

lition of the Coroner is a measure of practical reform, and that this Legislature should have granted it is one of the surprises of the year.

THE BALTIMORE TUBERCULOSIS CONFERENCE.

At a conference held in McCoy Hall on the evening of January 28, presided over by Prof. William H. Welch of Baltimore, at which a number of representative physicians interested in the study of tuberculosis from various parts of the country were present, the following motion by Dr. H. M. Bracken, of St. Paul, Minn., and amended by Dr. William S. Thayer, of Baltimore, was unanimously adopted: "Moved, That the chair be authorized to appoint a committee, with power to act, to consider the conditions existing with regard to the proposed tuberculosis congress and other national anti-tuberculosis associations in the United States; also to consider the formation of a national committee to represent this country at the International Congress at Paris, and that the members of this conference will abide by the action of the committee—also that this committee have power to add to its membership."

In accordance with this motion, Prof. William H. Welch appointed the following gentlemen on this committee: Prof. William Osler, Baltimore, Md.; Dr. Edward L. Trudeau, Saranac Lake, N. Y.; Dr. Theobald Smith, Boston, Mass.; Dr. J. G Adami, Montreal, Canada; Dr. Vincent Y. Bowditch, Boston, Mass.; Dr. S. A. Knopf, New York City; Dr. Mazyck P. Ravenel, Philadelphia, Pa.; Dr. Arnold C. Klebs, Chicago, Ill.; Dr Edward G. Janeway, New York City; Dr. Henry Barton Jacobs, Baltimore, Md.; Dr. H. M. Bracken, St. Paul, Minn.; Dr. Lawrence F. Flick, Philadelphia, Pa.; Dr. Herman M. Biggs, New York City.

A meeting of this committee was held in New York on the evening of February 27, and various plans were discussed, but it was voted to take no definite action till another meeting, to be held probably in New York early in April, when it is hoped that some final action will be taken toward forming a national committee to represent this country at the International Congress at Paris.

TUBERCULOSIS HOSPITAL TO BE BUILT AMONG PINES—THE SOCIETY'S WORK OF TWO YEARS.

At a meeting of the Speedwell Society for Sick and Convalescent Children at the residence of Miss Helen Miller Gould, 579

Fifth avenue, April 13, it was announced that Mrs. Andrew Carnegie had promised to duplicate the largest donation made for the benefit of that organization. It was also announced that Daniel G. Reid of the Rock Island Company had promised to be one of twenty to contribute $5,000 toward a fund of $100,000. Mrs. Russell Sage gave to the founder and president, Mrs. Daniel Sage Mackay, a check for $200.

There have never been sadder tales told or more pathetic pictures shown of little sufferers in any of the severe famines of the East than those which this society brings from the homes of the East Side tenements in New York. The children in almost every instance are suffering from diseases incident to lack of proper care and food. The improvement in them after they come under the influence of the society is almost miraculous. The society was organized by Mrs. Mackay two years ago. Some of its purposes are to relieve the children immediately, without a long red tape routine, to do the greatest possible amount of work with the money at command, to have every cent of the funds go for the benefit of the children, without wasteful expenditure for institutions and employees.

Many of the children treated are taken from the Post-Graduate Hospital of New York, and, by the advice of Dr. Henry D. Chapin, of the hospital, they receive individual treatment. They are boarded in private homes where they can have the "mothering" which Dr. Chapin believes every baby needs. This work is carried on in Morristown, N. J., where there is a resident matron, Mrs. Nannie Rigby, who visits the children every day, and a physician, Dr. Francis H. Glazebrook, who is always within call night or day. Both the doctor and matron were at the meeting yesterday and spoke of the work.

Of 132 children taken to Morristown during the past two years, only 20 have died. All were considered hopeless cases at first. The condition of the children when they are received is miserable. A picture of one of the society's babies is like a model. The subject of the picture is little Morris Reiter, who, when he was received at the hospital in November, 1903, weighed 5 pounds and 8 ounces, and in a few weeks tipped the scales at 25 pounds. Mrs. Rigby said that one of the saddest parts of the work was that of taking the children back to their homes and the old dangers.

Dr. Chapin spoke of his theory of the individual "mothering" needed by sick babies and the possibility of bringing the babies back to a state of perfect health. "If our good millionaires would

give more of their money for relief and less to research they would accomplish more," he said. He also said that he did not believe in the theory of letting the weakest die.

" 'Suffer little children to come unto me' does not mean that we are to let them die," said the Rev. Dr. Ernest M. Stires of St. Thomas's Church, "but that we are to teach them how to live."

Mrs. Carnegie's gift will be used for a tuberculosis cottage or hospital on a site chosen in the pines and as near New York as possible. It has been demonstrated that this disease is easily cured in the cases of most children, but it has not been possible to find homes for them in private families from the fear of the "great white plague." The society has now thirty-one patients, although it really has accommodations for only twelve or fifteen. Its ability is strained to the utmost. With the endowment fund it will place trained nurses in the tenement house districts to teach mothers how to prevent disease. No discrimination is made as to sect, nationality, or color among the children.

The Society need not go far afield. The pine woods of Long Island with their clean and sandy soil, are admirably adapted to the purpose.

MAD DOG.

All the experts agree, says the "New York Times," that no more dogs have rabies in summer than in winter, but according to popular impression the malady is one of hot weather, and needed information on the subject is therefore likely to be most easily planted where it is most needed at a time when people most feel the need. Hence is it, probably, that the Health Department of Chicago has just issued a hydrophobia bulletin. It is written in terms within the clear comprehension of all, and gives about the best description we remember to have seen of the symptoms manifested by a dog before he "runs mad." "Beware," it says, "of a dog when it becomes dull and hides away; appears restless; always on the move and prowling; whose countenance is sombre and sullen; walks with head down like a bear. Beware of one that barks at nothing, when all around is still. Beware of a dog that scrapes incessantly and tears up things. Look out for the dog who has become too fond of you and is continually trying to lick your hands and face. Beware, above all, of the dog which has difficulty in swallowing, which appears to have a bone in its

throat, and one that has wandered from home and returns covered with dirt, exhausted and miserable." No one of these manifestations is conclusive evidence that a dog has rabies, or is going to have it, but every one of them is a hint for caution well worth heeding, and if they were kept in mind it would be better both for men and dogs. It will be noticed that there is no mention of that "frothing at the mouth" which for no reason at all is commonly supposed to be the ever-present and indubitable proof that a dog is mad, and no attempt is made to distinguish between the two forms taken by this rare and obscure disease.

MORTALITY AND MORBIDITY REPORTS AND REVIEWS.

STATE OF NEW YORK.—Monthly Bulletin, Department of Health, for February, 1904, 7,735,000: Total number of deaths, 12,749; annual death rate, 20.7; deaths under 1 year, 1,782; deaths 1 to 5 years, 1,174; deaths at 70 years and over, 2,421; deaths from cerebrospinal meningitis, 48; typhoid fever, 145; malarial diseases, 9; smallpox, 1; scarlet fever, 149; measles, 94; erysipelas, 54; whooping-cough, 37; croup and diphtheria, 305; diarrheal diseases, 207; consumption, 1,179; pneumonia, 1,821; acute respiratory diseases other than pneumonia, 1,002, puerperal diseases, 143; diseases of the digestive system (not acute diarrhea), 606; diseases of the urinary system, 1,014; diseases of the circulatory system, 1,350; diseases of the nervous system, 1,239; cancer, 442; accidents and violence, 570; old age, 542; general diseases not epidemic (except consumption and cancer), 442; unclassified, 1,250.

The most notable fact connected with the mortality of the month is the increased mortality. It likewise exceeds the mortality of January, which was itself a month of excessive death rate, by 500, or to place them on the same basis, by a daily rate of 440 deaths against 400. At the present rate there would be 160,800 deaths in the year, or 44,000 more than occurred in 1903; and taking the two months of January and February, the rate for the year would exceed that of last year by 26,000.

Compared with last month the urban death rate for the entire State is 22 per thousand population, annually, against 20, and

the rural death rate is 20 against 16; the total rate being 20. against 18.7. The only material increase has been in deaths from typhoid fever. The percentage of deaths from epidemic diseases is, however, less this month, showing a relative increase in deaths from other causes.

Pneumonia was the cause of the chief increase: 1,820 deaths against 1,500 in January, or 14.3 per cent. of the total deaths against 12.3 per cent. With the exception of the Hudson Valley district, which shows no increase over last month, there was a large increase in deaths from pneumonia in all parts of the State. (It may be of interest to note in this connection the meteorological data, which shows for the eastern part of the State uniform cold weather with an unusual number of clear, sunshiny days and high range of barometer.) In none of the sanitary districts were less than 10 per cent. of the deaths from pneumonia, New York City having 16 per cent. of its deaths from this cause, an increase from 14 in January. In the year 1903 pneumonia caused 8 per cent. of the deaths.

Consumption diminished, relatively, as but 9.2 per cent. of all deaths were from it, against 9.7. All of the sanitary districts show this relative decrease, which is very marked in the Hudson Valley district.

Grippe was epidemic during these two months and was still in progress through March. How far it entered into the mortality of the month is a matter of estimate. In 5,000 deaths returned there were only 250 certificates on which this was given as in any way contributory to the mortality, or but half of one per cent. Without doubt it contributed to the unusual mortality of these months to a much greater degree than this, an analysis of which will be made later in the present epidemical prevalence.

An epidemic of *typhoid fever* developed in Watertown in January and has continued to the present time, through March, about 600 cases having occurred, with 48 deaths, to the present time, contributing largely to the increase in the mortality of this month from this cause. It was traced readily to the ***water supply, which*** *is an untreated sewage-bearing stream* and has for years past placed this city in the list of places of high typhoid fever mortality.

Smallpox exists in 47 municipalities in the State (at the end of March), but one death only has been reported from it during the month, which occurred in Brooklyn.

In his annual report, just submitted to the Governor (April 10),

State Health Commissioner Lewis says that the most conspicuous eature of the sanitary condition of the State during 1903 was the pidemic of *typhoid fever* which prevailed to an alarming extent t Ithaca and at West Seneca, near Buffalo, and points out that here is evidence to prove that similar conditions to those at thaca and West Seneca menace the public health of many nunicipalities of the State to-day as well as numerous health reorts, which are extensively patronized by citizens of other States esides New York.

Millions of dollars, the Commissioner asserts, are annually lost o the people of the State through preventable diseases. "If the nonetary value of a human life is assumed to be $5,000," he says, 'the deaths from but five of the preventable diseases during 1903 n this State represent a loss of $94,960,000. These figures seem appalling, and yet millions upon millions can properly be added to this sum, in loss of wages, expense of the care of the sick, and many other expenses incidental to the management of these epidemic and infectious diseases."

The deaths from the five preventable diseases referred to by Dr. Lewis were as follows: Pulmonary tuberculosis, 13,194; diphtheria, 3,056; typhoid fever, 1,665; scarlet fever, 1,057; smallpox, 41; total, 18,992.

The Commissioner says that the paltry $20,000 a year which is available for the purpose of a systematic supervision of water supplies, sewer systems, and drainage, that they may be remedied where danger exists, is too small to meet the required conditions and enforce the law. A new bureau of water supply and drainage in the Health Department is recommended. Immediate action is urged, as a serious epidemic now in progress has exhausted the available funds.

The chemical department made analyses of 69 samples of food and 50 samples of water. Of the food 22 samples, or 32 per cent., were found adulterated. Only such articles as were considered liable to adulteration of some kind were collected for examination. It was found that considerable kerosene oil of inferior and dangerous quality was being sold in violation of law.

In the report of the cancer research laboratory is the following: "The past year has not been characterized by any marked discoveries which can be safely announced to the world, but has been marked by a steady, earnest, and even laborious study along the lines of investigation." The deaths from cancer, according to the

monthly bulletins of the department, show an increase of about 500, or 10 per cent. over the total number the previous year.

The vital statistics of 1903 show a State death rate of 17.6 per 1,000 population and a birth rate of 21.8. "With as close a registration of births as there is of deaths, no doubt the true birth rate would exceed 25 per 1,000 population," says the report. In 1903 there were indexed and filed 89,067 birth certificates, 48,97[illegible] deaths, and 21,276 marriage certificates.

From the small number of reports of examinations of eyesight of school children received from school principals, 14.1 per cent were shown to have defective vision.

New York City, 3,838,024.—Total number of deaths, February, 7,017—annual death rate 23.0: Borough of Manhattan, 1,940,[illegible] 121; deaths, 3,952—death rate, 24.9. Borough of the Bronx 294,939; deaths, 450—19.0. Borough of Brooklyn, 1,334,952 deaths, 2,229—22.0. Borough of Queens, 193,494; deaths, 257—16.6. Borough of Richmond, 74,518; deaths, 129—20.8.

Infectious diseases reported for the two weeks ended April 2:

	Week ended Mar. 26.		Week ended Apr. 2.	
	Cases.	Deaths.	Cases.	Deaths.
Measles	1,554	29	1,265	28
Diphtheria and croup	359	44	343	39
Scarlet fever	494	25	393	30
Smallpox	1	..	..	..
Chickenpox	87	..	56	..
Tuberculosis	454	199	289	185
Typhoid fever	21	9	19	12
Cerebrospinal meningitis	..	13	..	31
Totals	1,970	319	2,365	325

CALIFORNIA.—San Francisco. Most recent report of *plague* received, March 12—119th case. Summary (Public Health Reports).—April 8: Calendar year, 1900, 22 cases, 22 deaths; 1901, 30 cases, 25 deaths; 1902, 41 cases, 41 deaths; 1903, 17 cases, 17 deaths.

COLORADO.—Denver, 175,000. Report for January: Deaths, 293—49 under 5 years; premature and still births, 12; death rate, per annum, 20.08. Deaths from phthisis, 57—"49 contracted elsewhere"; typhoid fever, 3 cases, 4 deaths; smallpox, 13 cases;

chickenpox, 11 cases; diphtheria, 43 cases, 8 deaths; scarlet fever, 59 cases, 4 deaths; measles, 99 cases, 1 death; erysipelas, 18 cases; deaths from heart diseases, 15; pneumonia, 59; broncho-pneumonia, 8; nephritis, 16; cancer, 3.

CONNECTICUT.—Bulletin for February: Deaths, 1,384—55 less than in January, and 81 more than in February of last year, and 132 more than the average number of deaths in February for the five years preceding. The death rate was 17.0 for the large towns; for the small towns, 19.0; for the whole State, 17.5.

Cases of deaths from infectious diseases reported: Measles, 716, 4 deaths, in 66 towns; scarlet fever, 194, 1 death, in 51 towns; la grippe, 29 deaths; diphtheria and croup, 94, 5 deaths, in 34 towns; whooping-cough, 61, 5 deaths, in 14 towns; typhoid fever, 21, 1 death, in 15 towns; consumption, 24, 23 deaths, in 11 towns.

Pneumonia.

The 217 deaths from pneumonia in the shortest month in the year is so much in excess of other diseases and of its own fatality in former years, as to force the inquiry if there are any means of prevention. Since the pandemic of la grippe in 1899-90, the prominence of pneumonia as a fatal disease has been steadily above any previous record. The records show that ever since 1899-90, in the winter and spring months, pneumonia has been more fatal than any other malady. Now la grippe is an infectious and communicable disease with a special tendency to attack the lungs. Pneumonia is also an infectious disease, and the infection is believed to be very prevalent, and often found in the mouths of healthy people, who are quite able to resist it so long as their respiratory surfaces are in a normal condition. But attacked by la grippe, they become also vulnerable to the disease germ which causes pneumonia. Hence in many cases the order is, first the grip, then pneumonia. So, too, any other respiratory irritant will have a like effect and render the subject susceptible to the pneumonic inflammation. Depressing influences of every kind are contributory to this susceptibility, but especially those which may tend to inflame the respiratory passages.

DISTRICT OF COLUMBIA, 300,902—91,603 colored. Report for the week ended April 2: Deaths, 125—75 white, 50 colored. Death rates, 18.6, 28.4: 21.6, as compared with 17.6, 30.3, and 21.4 for the corresponding period of last year. Deaths from consump-

tion, 21; diseases of the heart, 17; kidneys, 9; from pneumonia, 8; and grippe, 6. Diphtheria cases increased from 11 to 14—7 new cases and 4 discharges. Scarlet fever diminished, but 5 new cases and 19 discharged, leaving 41 cases under treatment in 26 different premises, as against 55 cases the previous week. Typhoid fever, 7 new cases, 6 discharged; 46 cases under observation.

No new cases of smallpox have occurred and the city is entirely free from this disease.

The births reported numbered 104, of which 66 were white and 38 were colored.

The weather conditions prevalent during the past week were as follows: Temperature (mean) 45°, mean relative humidity 76, mean actual barometer 30.03. The winds were northwesterly in direction, averaging 7 miles an hour, with a maximum velocity of 24 miles on the 2d instant. The maximum temperature was 69° on the 1st, and the minimum 24° on the 24th ultimo.

ILLINOIS.—Chicago, 1,950,000. Health Department Bulletin: Quarter ended March 31; month of March, 1904. Compared with the other large cities of the country, Chicago has come out remarkably well through the trying ordeal of a memorable winter. The 7,675 deaths reported during the first three months of the year represent an annual death rate of 15.77 per thousand of population. For the corresponding quarter of 1903 the total deaths were 7,856 and the annual death rate was 17.10 per thousand, or nearly 8 per cent (7.7) higher. New York, 3,437,202; 21,538, 25.22. Philadelphia, 1,408,154; 8,205, 23.39. Boston, 617,950; 2,924, 18.95. Baltimore, 541,000; 3,058, 22.73. Chicago, 1,950,000; 7,675, 15.77.

Mortality for the quarter ended March 31, 1904, compared with the corresponding quarter of 1903:

	1904.	1903.	Dec.	Inc.
Total deaths, all causes	7,675	7,856	181	..
Death rate per annum, per 1,000	15.77	17.10	1.33	..
Under 1 year	1,368	1,361	..	7
Between 1 and 5 years	571	814	243	..
Over 60 years	1,724	1,703	..	21
Bright's disease	478	431	..	47
Bronchitis	357	386	29	..
Consumption	858	774	..	84
Cancer	282	257	..	25
Convulsions	193	187	..	6

Diphtheria	109	138	29	..
Heart diseases	582	595	13	..
Influenza	50	106	56	..
Measles	3	69	66	..
Nervous diseases	311	360	49	..
Pneumonia	1,811	1,641	..	170
Typhoid fever	97	200	103	..
Scarlet fever	59	103	44	..
Smallpox	1	23	22	..
Suicide	101	127	26	..
Violence—other than suicide	340	321	..	19
Whooping cough	4	116	112	..

Statement of mortality for the month of March, 1904, compared with the preceding month and with the corresponding month of 1903:

	Mar. 1904.	Feb. 1904.	Mar. 1903.
Total deaths, all causes	2,609	2,705	2,713
Annual death rate per 1,000	15.74	17.92	16.94
Under 1 year	430	499	453
Between 1 and 5 years	176	215	275
Over 60 years	573	618	573
Bright's disease	157	165	142
Bronchitis	93	141	127
Consumption	332	278	280
Cancer	97	100	80
Convulsions	61	73	73
Diphtheria	31	38	49
Heart diseases	181	196	207
Influenza	18	31	61
Measles	2	..	22
Nervous diseases	112	104	132
Pneumonia	621	686	582
Scarlet fever	18	26	30
Smallpox	..	..	8
Suicide	38	32	52
Typhoid fever	34	33	49
Violence (other than suicide)	114	116	101
Whooping cough	3	..	42

The city water is still bad, all stations showing the presence of serious contamination during the last three days of the week.

Nearly every sample shows the presence of colon bacilli and an excessive number of other bacteria. This condition is becoming progressively worse, and may be expected to continue for some weeks.

INDIANA.—State Board of Health Bulletin for February: The total number , 3,477, rate 17.4. Corresponding month last year, 2,677, 13.8. Preceding month, 3,177—14.8. The increase in pneumonia accounts in a degree for this increase in deaths.—Deaths under one year, 521, or 15.3 per cent. of the total; 1 to 5 years, 260; 5 to 10 years, 91; 10 to 15 years, 63; 15 to 20 years, 109; 65 and over, 921, or 27.6 per cent. of the total.—Deaths from pulmonary tuberculosis, 365; typhoid fever, 60; diphtheria, 32; scarlet fever, 23; pneumonia, 711; influenza, 116; cancer, 78; violence, 142; smallpox, 5. The city death rate was 21.7, and the country rate 15.1. The death rate among old people in the country was higher than in the same class in the cities. The cities present the highest death rate in consumption, typhoid fever and pneumonia. The country presents a higher death rate in influenza. Two of the smallpox deaths occurred in cities, and three in the country.

Measles was the most prevalent disease, and then follow in the order given, bronchitis, pneumonia, influenza, tonsillitis, rheumatism, scarlet fever, typhoid fever, diphtheria, diarrheal diseases, erysipelas, whooping-cough, cerebrospinal meningitis, dysentery, puerperal fever, cholera morbus, cholera infantum.

Four hundred and eight cases of smallpox were reported, with 5 deaths, in 34 counties. In the preceding month there were 480 cases and 8 deaths in 38 counties, and in the corresponding month last year there were 889 cases with 50 deaths in 59 counties. Sixty deaths were reported from typhoid fever, and in the corresponding month last year there were 49 deaths. This is an increase of almost 20 per cent., for which we can offer no particular reason.

The increase in pneumonia is alarming, the total deaths being almost twice as many as from tuberculosis. The pneumonia death rate in the cities is 417 per 100,000, and in the country 323. Of the total pneumonia deaths, 353 were females and 429 males, and 155 were children under one year of age. Of the 142 deaths from violence 6 were murders, 21 suicides, and the remainder accidents.

A careful study of the matter points to the conclusion that the

pneumonia increase attended the increase in measles and influenza and was not caused by weather conditions.

IOWA.—State Board of Health Bulletin, February-March: Outbreaks of infectious diseases in January: Typhoid fever in Vinton; chickenpox, Des Moines; measles in 3 localities; diphtheria in 9 localities; smallpox in 8 localities; scarlet fever in 23 localities. In February: Chickenpox, Spirit Lake; measles in 11 localities; diphtheria in 13 localities; scarlet fever in 31 localities; smallpox in 12 localities.

LOUISIANA.—New Orleans, 317,000—84,000 colored. Report for March, 1904: Total deaths, 397 white, 249 colored: 646; deaths under 1 year—white, 70; colored, 34; 1 to 5 years—white, 31; colored, 19. Death rates: white, 20.44; colored, 35.57: 24.45. Deaths from typhoid fever, 2 white; pneumonia, 42 white, 37 colored; tuberculosis of the lungs, 42 white, 47 colored; Bright's disease, 31 white, 10 colored; cancer, 15 white, 3 colored; senile debility, 12 white, 8 colored.

MICHIGAN.—The Secretary of the State Board of Health reports: Compared with the preceding month, cancer, smallpox, cholera morbus, meningitis, membranous croup and puerperal fever were more prevalent; and syphilis, typhoid fever, intermittent fever, and dysentery were less prevalent. Compared with the average for March in the 10 years, 1894-1903, scarlet fever, typhoid fever, smallpox, diphtheria and membranous croup were more than usually prevalent; and pneumonia, erysipelas, inflammation of bowels, intermittent fever, remittent fever, whooping-cough, dysentery, cholera morbus and puerperal fever were less than usually prevalent. Meningitis was reported present at 10 places, whooping cough at 22 places; diphtheria at 81 places, typhoid fever at 82 places, smallpox at 138 places, measles at 152 places, scarlet fever at 162 places; pneumonia at 166 places, and consumption at 238 places.

The total number of deaths returned to the Department of State for the month of March was 3,406, 19 more than for the preceding month. Death rate, 16.0, as compared with 17.1 for the preceding month.

Deaths from prevailing causes: Tuberculosis of lungs, 227; other forms of tuberculosis, 43; typhoid fever, 57; diphtheria and croup, 38; scarlet fever, 31; measles, 27; whooping-cough, 21;

smallpox, 3; pneumonia, 384; influenza, 156; cancer, 149; accidents and violence, 199.

By ages there were 527 deaths of infants under 1 year of age: 185 aged 1 to 4 years, inclusive, and 1,159 deaths of elderly persons 65 years and over.

MINNESOTA.—Minneapolis, 240,000. Report for February: Deaths, 221—43 under 5 years. Annual death rate, 9.8. Deaths from typhoid fever, 17; consumption, 23; cancer, 1; organic heart disease, 19; other diseases of the circulatory system, 4; bronchitis, 2; pneumonia and broncho-pneumonia, 36; Bright's disease, 9.

St. Paul, 185,000. Report for February: Deaths, 156—37 under 5 years; death rate, 10.11. Deaths from consumption, 9; tuberculosis, 5; pneumonia, 21; broncho-pneumonia, 1; typhoid fever, 2; nephritis, 8; scarlet fever, 1; cancer, 3.

MISSOURI.—St. Louis, 645,000. Report for February: Deaths, 1,013—208 under 5 years; annual death rate, 18.84. Deaths from zymotic diseases, 79; scarlatina, 15; diphtherian croup, 11; typhoid fever, 7; whooping-cough, 5; consumption, 104; pneumonia, 171; bronchitis, 55; other diseases of the respiratory organs, 43; diseases of the circulatory system, 71; Bright's disease and nephritis, 47; cancer, 30.

NEW JERSEY.—Hudson County (Jersey City and environs), 433,573. Report for February: Deaths, 760—209 under 5 years; death rate, 21.0. Deaths from croup, 12; diphtheria, 8; scarlet fever, 15; whooping-cough, 4; typhoid fever, 6; all zymotic diseases, 76; phthisis, 99; bronchitis, 25; pneumonia, 126; cancer, 25; violence, 35; suicides, 10; still births, 59.

NORTH CAROLINA.—Bulletin of mortality for February summarizes reports of 23 towns, with aggregate populations: White, 86,250; colored, 58,550: 144,800. Deaths, respectively, 92, 142: 234. Death rates, 12.6, 29.1: 19.4. Deaths from consumption, white, 12; colored, 25: 37. Heart diseases, white, 12; colored, 11: 23. Pneumonia, white, 15; colored, 29: 44.

Biennial report, 1901-1902: The primary work of the Board for the period was the protection and purification of the water supplies, and insistence upon water analysis whenever and wherever cases of typhoid fever have occurred. Efforts in this direction, however, the secretary reports, have borne but little fruit. Legis-

lation has been effected for securing prompt reports to, and the co-operation of the county superintendents of health with the State Board, for the prevention of typhoid fever, smallpox and other preventable diseases. Smallpox was a continuous subject of contention, but with encouraging success, the number of cases reported being near 1,000 less than for 1899-1900: 1,945, against 2,806, of whom 530 were white and 1,415 colored. The death rates were 2.83 per cent. for the white, against 4.78 per cent. for the colored. The difference is attributed to a like proportion of the unvaccinated, respectively. Special committee and other reports by the members of and inspectors for the Board show that the most important present needs of the cities, towns and public institutions for the maintenance of the public health and the health of dependent persons throughout the State are the protection of the water supplies, sewerage and drainage.

OHIO.—Sanitary Bulletin, January-February, 1904. For the most part, proceedings of the fourteenth annual meeting of the State and Local Boards of Health, at Columbus, January 21st and 22d, of practical interest to health authorities generally.

Cases of and deaths from infectious diseases reported to State Board of Health during 11 weeks, ended March 12, 1904, 106 places, with an aggregate population of 1,410,379: Croup and diphtheria, 652 cases, 66 deaths; scarlet fever, 444 cases, 22 deaths; typhoid fever, 1,256 cases, 137 deaths; whooping-cough, 64 cases, 5 deaths; measles, 3,591 cases, 51 deaths. *Smallpox,* in 88 localities, 1,282 cases, 25 deaths.

Cleveland, 430,000. Report for February: Deaths, 682—241 under 5 years; annual death rate, 19.03. Deaths from typhoid fever, 45; diphtheria and croup, 75; tubercle of lungs, 63; pneumonia, 71; broncho-pneumonia, 18; bronchitis, 12; cancer, 22; heart diseases, 13; Bright's disease, 31; early infancy—congenital icterus, debility, etc.—49; senile debility, 27.

PENNSYLVANIA.—Philadelphia, 1,408,154. Report for week ended April 2: Deaths, 588—145 under 5 years; annual death rate, 21.72. Deaths from typhoid fever, 24; Bright's disease, 34; consumption, 74; diphtheria, 9; measles, 13; diseases of the heart, 54; pneumonia, 61; broncho-pneumonia, 35; congestion of the lungs, 4; cancer, 18; *smallpox,* 7.

Report on contagious diseases, compared with that of the previous week:

	Week end'd Apr. 2.		Week end'd Mar. 26.	
	Cases.	Deaths.	Cases.	Deaths.
Smallpox	32	7	35	8
Diphtheria	67	9	88	12
Scarlet fever.....	92	7	116	5
Typhoid fever.....	321	24	148	17
Consumption	..	74	..	60
Cerebrospinal fever..	..	..	..	..

Medical Inspection of Schools Instituted.—The daily medical inspection of children in the Public Schools of Philadelphia began on April 5th. With the possible exception of a few schools in outlying sections, every school will be visited daily. Director Martin states that the first object of the inspectors will be to exclude children suffering from contagious diseases; secondly, to exclude all those who have non-contagious diseases, but who are too ill to remain in school. Afterward there will be made a careful examination in order to discover physical defects, including spinal curvature, flatfoot, deafness, defective eyesight, narrow chest, etc. Diagnoses will be communicated to teachers by a code in order that the child may not know the nature of the disease. In all cases the parents are to decide regarding any medical care to be instituted.

Pittsburg, 354,000. Report for the week ended April 2: Deaths, 138—54 under 5 years; annual death rate, 20.27. Deaths from diphtheria and croup, 5; whooping-cough, 2; measles, 2; typhoid fever, 6; tuberculosis, 3; pneumonia, 21; cancer, 4.

The Butler Epidemic.—The total number of cases reported up to the time of closing the Emergency Hospital, was 1,364, and the number of deaths, 115. A noteworthy feature of the epidemic was the infection of about twenty of the nurses, amounting to nearly 10 per cent. of the number employed.

PHILIPPINE ISLANDS AND MANILA, 219,241.—Filipinos, 189,782; Chinese, 21,230; Americans, 4,389; other nationalities, 4,590. Report for November, 1903: Total number of deaths, 1,026—404 infants under 1 year.

The principal causes of mortality and more important diseases entering into the same, with the total number of deaths therefrom, were: Convulsions of children, 342; pulmonary tuberculosis, 68; acute bronchitis, 65; eclampsia, nonpuerperal, 58; chronic bronchitis, 41; beri-beri, 36; meningitis, 33; congenital

debility, 28; chronic diarrhea and enteritis, 25; dysentery, 24; Asiatic cholera, 23; malarial fevers, 16; puerperal septicæmia, 12; cerebral hemorrhage, 10; typhoid fever, 8; tetanus, 7; smallpox, 2; bubonic plague, 2; leprosy, 1; diphtheria, 1.

There were 2 deaths from *bubonic plague,* both in Filipinos. Prophylactic inoculations against plague have been so generally carried out among the Chinese as to largely protect that especially susceptible class against this disease. During the month there were 2,157 primary and 1,515 secondary antiplague inoculations made among the Chinese.

There were 23 deaths from *Asiatic cholera* among residents, of which none occurred in whites and but 2 in Chinese. There were also 3 deaths from this disease among transients. Following the sudden outbreak in September, of which mention was made in the report for that month, this disease has steadily yielded to the repressive measures taken. Although during the month a number of cholera cases occurred on the drainage area of the city water supply, the special efforts of the Board of Health have successfully prevented the infection of this supply.

Beri-beri caused 36 deaths, of which 13 occurred among Chinese, while *smallpox* caused 2 deaths, of which 1 was an American.

PORTO RICO. 953.243.—Report for the period, May 1, 1900, to June 30, 1903; 233 pages, comprehending a sketch of the physical features of the island, the municipal organization, more particularly the organization and work of the Board of Health and the subjects with which it had to contend: garbage, sewerage, drainage, plumbing, milk and other food supplies, slaughter of food animals, hospitals, cemeteries, diseases of animals, etc., showing a very complete and efficient organization. Vital statistics are presented, as in the monthly, from which abstracts have been regularly given in our pages.

WISCONSIN.—Milwaukee, 315,000. Report for February: Deaths, 389—117 under 5 years; annual death rate, 15.06. Deaths from typhoid fever, 1; diphtheria, 3; phthisis, 39; pneumonia and broncho-pneumonia, 69; bronchitis, 18; cancer, 17; organic heart disease, 36; Bright's disease, 17; congenital debility, 30; senile debility, 26; violence, 19.

Smallpox has about died out, there being only a case here and there. A remarkable fact is, that although there were a large number of cases of contagious diseases reported, still the deaths

from these diseases were very few. Typhoid fever, 1; scarlet fever, 2; whooping-cough, 1; diphtheria, 1.

CUBA.—Havana. Chief Sanitary Officer Finlay reports for December, 1903, the total mortality in the district of Havana, 528—54 more than in the preceding 31 days, and 71 more than in December of last year; annual type of 23.69, the highest annual death rate in any month of the year 1903, the next highest having occurred in April, with 22.00 per thousand.

The additional deaths (54) in the district of Havana, as compared with the preceding 31 days, occur mostly under the headings of: Simple meningitis, 11; diseases of arteries, embolism and thrombosis, 29; broncho-pneumonia, 15; diarrhea and enteritis, 14. On the other hand, there was a diminution in the deaths from "general diseases" (26), including scarlet fever, 20; cancer, 5, and only 2 additional deaths from tuberculosis. The deaths among children under 5 years of age, 135, as against 148 in the preceding 31 days, and against 121 in December, 1902, when there had been no deaths from scarlet fever.

BUBONIC PLAGUE IN PERU.—According to a telegram from Mr. Dudley, the United States Minister at Lima, Peru, received at the State Department, Washington, on March 31st, that city has been attacked by Asiatic plague. The same telegram states that there was 32 cases in the week ended March 26th, and that 2 deaths occurred on March 30th. The State Department has notified the Marine Hospital and the Public Health Service of Mr. Dudley's information.

PLAGUE IN INDIA.—The deaths by bubonic plague in India during the week ended on March 19th numbered 40,527, an increase of 7,000 over those for the preceding seven days.

BUBONIC PLAGUE AND EPIZOOTY IN MAURITIUS.—Under date of December 8, 1903, United States Vice-Consul J. W. Hollway, of Port Louis, Mauritius, reports that the bubonic plague, which seemed to have been abating in the island, had, at the date of his writing, assumed an epidemic form of a virulent type. The number of cases of bubonic plague on the island in 1902 was 506, of which 386 died—a decrease, as compared with 1901, of 587 cases and 419 deaths. Of the "surrah," or epizooty, which broke out among the horses and cattle in 1902, he reports its sad havoc

during the year 1903, it being estimated that three-fourths of the draft animals succumbed thereto, and that agriculture—especially the sugar plantations—suffered very severely, but owing to the substitution of mechanical for animal traction a calamity was averted. Mr. Hollway says that the common house-fly is supposed to spread the distemper.

DECREASE OF MORTALITY FROM TUBERCULOSIS IN GERMANY.—United States Consul-General Richard Guenther, of Frankfort, Germany, under date of December 17, 1903, reports that the monograph of Professor Mayet, "Twenty-five Years of Statistics of Mortality," published by the German imperial office of statistics, furnishes a gratifying picture of the decrease of mortality from tuberculosis in Germany. It says the mortality from this cause in the German cities of 15,000 and more inhabitants for every 10,000 people for every five years was, on the average, as

1877-1881	357.7
1882-1886	346.2
1887-1891	304
1892-1896	255.5
1897-1901	218.7

SEWERAGE AND DRAINING OF MAZATLAN.—Señor Victor Patron, president of the Mazatlan Board of Trade, received a telegram on October 7 from Governor Francisco Canedo, of Sinaloa, confirming the contract with the Mexican Government, between Governor Canedo, for the State of Sinaloa and the city of Mazatlan, and William Astor Chanler, of New York City, who is represented in Mexico by Attorney Alfredo Chavero, of the City of Mexico, to furnish a complete system of sanitary sewerage and drainage for the city of Mazatlan. The price for work and material, as well as all conditions, are on the same basis as the contract now in force with the city of Tampico, where a like piece of improvement is now being constructed. For information as to sub-contracts, furnishing material, and machinery, interested parties should apply to Alfredo Chavero, attorney, City of Mexico, or William Astor Chanler, New York City.—Louis Kaiser, Consul, Mazatlan, Mexico, November 28, 1903.

SUICIDE.

In an instructive article contributed to "The Independent," Mr. George P. Upton, perhaps the best unofficial authority in this

country on the subject treated, shows that within the past thirteen years 77,617 people have committed suicide in this country. In 1902 fifty cities furnished 2,500 cases of self-destruction, out of a total of 8,132 for the entire country. Of the 77,617 suicides in the thirteen-year period, 57,317 were males and 20,400 females. The greatest ratio of increase is among young women under 25 years of age. Another curious fact is the increasing number of children who kill themselves.

Of the methods chosen for ending life it is curious that a very large proportion select carbolic acid. It is cheap and easily accessible, no doubt, but it must cause an extremely painful death, giving the victim a brief period of intense suffering while the vital organs are being destroyed by corrosion. The suggestion that the sale of carbolic acid should be placed under the same restraint as other deadly poisons does not seem to promise much. So many other and, for that matter, easier modes of self-destruction are available that to cut off one would probably not affect the net result appreciably. Prior to 1894 more suicides died from bullets than from all other agencies combined. Since then poison seems to have been preferred, with carbolic acid a favorite. The remainder is divided between hanging, drowning, the knife, jumping from windows or roofs, gas, fire and dynamite, while as many as 800 selected the expedient of throwing themselves in front of locomotives.

These are gruesome statistics. The lesson to be learned from them depends largely upon the point of view. For some its moral, for others its ethical, aspects predominate. For all it must mean that an increasing percentage of people of at least average sanity find life a bore, and, for one or another of an almost infinite variety of morbid and sophistical reasons, choose to end it. The more complex our civilization and the greater the opportunity for failure and disappointment, the stronger the tendency to self-destruction.

WHERE MEASLES COME FROM.

"If I understand this measles business right," says a Carthage punster, "the German measles come from a germ, the French measles from a Parisite, the Irish measles from a Mike-crobe, and the black measles from Africa."

BOOK REVIEWS.

FISCHER—INFANT-FEEDING IN ITS RELATION TO HEALTH AND DISEASE.—A modern book on all methods of feeding. For students. practitioners and nurses. By LOUIS FISCHER, M.D., Visiting Physician to the Willard Parker and Riverside Hospitals, of New York City; Attending Physician to the Children's Service of the New York German Poliklinik; Former Instructor in Diseases of Children at the New York Post-Graduate Medical School and Hospital; Fellow of the New York Academy of Medicine, etc. Third edition, thoroughly revised and largely rewritten. Containing 54 illustrations, with 24 charts and tables, mostly original. 357 pages, 5¾ x 8¾ inches. Neatly bound in extra cloth. Price, $2.00, net. F. A. DAVIS COMPANY, Publishers, 1914-16 Cherry street, Philadelphia, Pa.

The succeeding editions of this excellent book keep apace with the improvements in this progressive field of study. In this edition, the notable improvements are the feeding of dyspeptic and atrophied children; rectal feeding in institution cases, and the feeding of children with cleft palate. Butter-milk feeding is the subject of a new chapter of evident practical utility. New illustrations of poor breast milk are shown as reason for the substitution of artificial food. Modified milk is also the subject of a special chapter, comprehending much useful information. In several other respects—indeed, as a whole—the book is thoroughly up to date and commendable.

THE INTERNATIONAL MEDICAL ANNUAL, 1904.—Twenty-second year of publication. 8vo. 740 pp., and with numerous illustrations. Post or express paid, $3.00, net. E. B. TREAT & Co., Publishers, 241-243 West 23d street, New York.

This work maintains its accorded excellence as a careful collation of the cream of medical progress for the year. It gives the gist of an amazingly comprehensive category of subjects of interest to all physicians, with an elaborate index, affording the utmost facility for ready reference and practical utility.

THE DECLARATION OF INDEPENDENCE, from M. WALTER DUNNE, Publisher, 135 Fifth avenue, New York, is an admirable presentation. A reduced facsimile of the original, 22 x 30, and done in seven colors on choice drawing-paper, with the seals of the original States and the United States. Each copy bears the

certificate of the Secretary of State in facsimile, attesting its authenticity.

NEW JERSEY TRAINING SCHOOL FOR FEEBLE-MINDED GIRLS AND BOYS.—Fifteenth Annual Report, 1903. At the close of the year, May 21, 1902, the population was 89 girls, 163 boys: 252. Admitted during the year, 22 girls, 26 boys: 48. Enrolment, 111 girls, 189 boys: 300. Dismissed, 15: 4 girls and 11 boys. Died, 6—3 of each.

The physician reports the general health of the institution throughout the year good; almost practical freedom from contagious diseases—an outbreak of measles limited to one cottage.

"One of the most frequent questions asked is: What can be done in a school for the feeble minded to make that child more useful or nearer a normal child? Much depends on whether the child is an idiot, a high or low grade imbecile, or a backward child. It is easy to distinguish an idiot from a low or a high grade imbecile; but to distinguish a high-grade imbecile from a backward child is not always so easy, and may require some diagnostic skill.

"An idiot will always remain the same. His habits may be somewhat improved, but we can expect little besides. A low or middle grade imbecile may become more tidy, useful and better mannered, and in many ways show an improvement, but unless under constant training he soon falls back, and if neglected, will rapidly retrograde where he was before he came under constant training. The high-grade imbecile or the backward child is the one that responds most to treatment.

"As manual training and gymnastics are essential in developing dormant faculties, they form a most important part in our work. They are 'education by doing.' We must not try to develop a single set or series of muscles in simple or complex movements, but develop to some extent the entire muscular system, for the defective child's entire body must be stimulated, and in that way we reach the brain areas, as the motor centers are the special avenues to the higher cerebration.

"All children, both normal and abnormal, have physical and moral habits, either good or bad. Not only habits of body and of mind, but cleanly and methodical ways, conduct at the table, at rising, at lying down and in the training-room, at assembly, at play, at work, at day school, if capable of it, at kindergarten, if capable of it, at manual labor, if capable of that.

"We must teach these children self-control, and unless we can overcome bad habits in the younger years, there is but little hope after they become fixed. And so we are responsible to a greater or less extent for good and bad habits which are formed, and the child's progress may be measured to some extent by the influence we exert. By careful supervision and attention the bad habits are diminished and the good increased."

Brief assays are appended on "The Educational Phase of the Work," and "Humanitarian Aspects."—Edward R. Johnstone, Superintendent, Vineland, N. J.

THE AMERICAN SOCIETY FOR THE PREVENTION OF CRUELTY TO ANIMALS.—Thirty-eighth Annual Report, 1903.

There appears to have been considerable enlargement in the scope of the work of the Society during the year, and continued encouragement by increasing public sentiment in its favor. The last mortgage, with which the headquarters of the Society has been burdened, has been extinguished, and for the first time in the history of the corporation the Society is in the possession of a building especially erected for its work, free and clear of all encumbrance, and with a cash balance on hand of $2,404.40.

The superintendent reports that 90 per cent. of complaints of acts of cruelty to animals are not prosecuted, because the alleged cruelty is of such a trifling nature as not to warrant such procedure. Underground, and consequently, insufficiently ventilated and overcrowded horse stables have been a constant subject of concern. Considerable progress has been made in the effort to overcome these conditions, but much yet remains to be done. The cruelty of overloading is an abiding bane, requiring constant attention. It is but rarely done through ignorance, however, but for mercenary motives and, for the same reason, it is defended and conviction rendered difficult.

A number of striking cases are reported in detail. They are well calculated to promote the work of the Society. Appended is a comprehensive list of the Societies of North and South America, and of kindred societies in other countries, devoted to the purpose, and a historical sketch of the work accomplished.

ADIRONDACK COTTAGE SANITARIUM, SARANAC LAKE, N. Y.—Nineteenth Annual Report. EDWARD L. TRUDEAU, M.D., Physician in Charge.

The principal improvements effected during the year have been

the rebuilding or Hall Memorial Cottage; a new reservoir, and a new icehouse, with cold-storage rooms.

The Free Bed Fund has been utilized, as in past years, to aid as many as possible of the needy patients. Fifteen patients have been kept in the institution without charge.

The medical report shows that 298 patients have been treated during the past year, which is the largest number treated during any year since the Sanitarium was established.

A most exhaustive inquiry has been made by Dr. Lawrason Brown, the Resident Physician, bearing on the permanency of the good results obtained at the Sanitarium in past years. Of 1,500 cases which have been discharged, from two to seventeen years ago, 334 could not be traced, leaving 1,066 which have been traced. Of these, 46.7 per cent. are still living. Thirty-one per cent. are known to be well at present; in 6.5 per cent. the disease is still arrested; 4 per cent. have relapsed; 5.2 per cent. are chronic invalids, and 53.3 per cent. are dead. Thus we learn that 31 per cent. of all cases discharged from two to seventeen years ago have remained well.

"The object of the Adirondack Cottage Sanitarium is to help back to health people of limited means who are suffering from tuberculosis, and could not otherwise afford the time and expense necessary for its successful cure. So general has been the support of its friends that the sanitarium is well equipped for combating the disease most successfully. There is still one thing needed to supplement the treatment, and this letter is intended to explain that need, and ask your hearty co-operation to supply it.

"The inactivity necessary for the successful treatment of tuberculosis renders patients, at their discharge, unfit for immediate return to their former active life. To make their cure permanent it is often advisable to follow the sanitarium treatment by several months, and sometimes several years, of light and healthful work.

"The patients at the sanitarium represent a great diversity of trades, crafts and professions. It seems very probable, also, that there exist positions where a moderate amount of work is required, but not enough to justify a salary which would attract a perfectly able-bodied person of equal skill and intelligence.

"To meet this need the sanitarium has organized a co-operative employment bureau, in behalf of which it asks the earnest support of patients, ex-patients, and all friends of the institution.

"Blank forms have been prepared asking for the information necessary to guide the bureau in making the best selection of

candidates. The resident physicians will give this matter their careful attention, and will furnish full information, in each case, as to the condition and physical limitations of the candidate.

"No patient will be recommended to a position who will in any way endanger the health of his associates."

ADIRONDACK COTTAGE SANITARIUM CO-OPERATIVE BUREAU,
LLEWELLYN R. PERKINS, *Secretary.*

MEDICAL LIBRARY AND HISTORICAL JOURNAL QUARTERLY, to be "Devoted to Medical Libraries, Bibliography, History and Biography"—that is its aim. And this does not mean a series of dry-as-dust articles on ancient worthies, culled from some encyclopedia. $2.00 a year. ALBERT T. HUNTINGTON, Editor. Address all communications, Medical Library and Historical Journal, 1313 Bedford avenue, Brooklyn, N. Y., U. S. A.

BROCHURES AND REPRINTS RECEIVED.

Experiments Concerning Tuberculosis, under the supervision of the Biochemic Division, Part I: The Virulence of Human and Bovine Tubercle Bacilli for Guinea-pigs and Rabbits, by Marion Dorset, M.D. Bulletin No. 52, Bureau of Animal industry, U. S. Department of Agriculture, Washington, D. C.

Bovine Tuberculosis and Public Health. D. E. Salmon, D.V.M. Bulletin No. 53, Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C.

Keeping Quality of Butter, I. Canned butter, Lars A. Rogers. Bulletin No. 57, Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C.

Clinical Reports by the Surgeons of the New Amsterdam Eye and Ear Hospital for 1903, 230 West 30th street, New York: Mastoiditis, Thomas R. Pooley, M.D., New York; Diagnosis of Internal Ear Diseases, Geo. W. McDowell, M.D., New York.

Recent Advances in the Management of the Diseases of Children. C. G. Kerley, M.D., New York.

Movable Kidney, Treatment of 442 cases, without Surgical Intervention. Charles D. Aaron, M.D., Detroit, Mich.

Flatulence and Tympanites. *Ibid.*

Subsequent Histories of Arrested Cases of Phthisis Treated at the Sharon Sanitarium. Vincent Y. Bowditch, M.D., Boston, Mass.

Psoriasis. S. C. Martin, M.D., St. Louis, Mo.

Pneumonia: A Clinical Study. Reynold W. Wilcox, M.D., New York.

Consumption a Curable Disease. Addison W. Baird, M.D., New York.

Thirty Pictures of Tuberculosis: Communicable, Preventable Curable. *Ibid.*

Treatment of Chronic Diseases by Physical Therapeutics. Albert C. Geyser, M.D., New York.

Epithelial Cystoma of the Conjunctiva. Edward L. Oatman, M.D., New York.

Nervous Exhaustion. Amos J. Givens, M.D., Stamford Hall, Stamford, Conn.

The Present Status of Iron Therapy. Reynold W. Wilcox, M.D., New York.

Intestinal Fermentation. Robert T. Morris, M.D., New York.

Ovarian Grafting. *Ibid.*

Clinical Lecture on the Treatment of Gonorrhœa. H. M. Christian, M.D., Philadelphia, Pa.

Contribution to the Prophylaxis of Venereal Diseases. G. Morgan Muren, M.D., Brooklyn, N. Y.

Pulmonary Malingering. W. T. English, M.D., Pittsburg, Pa.

Immunization from Hog Cholera. D. E. Salmon, D.V.M. Circular No. 43, Bureau of Animal Industry, U. S. Department of Agriculture, Washington, D. C.

County and Municipal Law Reports. Municipal and Sanitary Record, Glasgow, Scotland.

Contribution el Estudio de la Escarlatina en la Habana. Dr. Mario G. Lebredo, Habana, Cuba.

The Susceptibility of the Negro to Tuberculosis. Thomas D. Coleman, M.D., Augusta, Ga.

CONTEMPORARY LITERATURE.

PANAMA CANAL—THE PROBLEM OF SANITATION.—"Sanitary Conditions and Diseases Common to the Isthmus of Panama" were described by Dr. Herbert O. Shiffert, U. S. Navy, in our February number. How they are to be dealt with is pretty clearly indicated by an article on "The Panama Commission and Its Work," in the April number of the "American Monthly Review of Reviews," by Mr. Walter Wellman. "In fact," he says, "preliminary investigations in this line have already been made. The commission will send to the Isthmus Col. W. C. Gorgas, the yel-

low fever expert of the army, who has done such excellent work in Cuba. He will study the local situation and prepare comprehensive plans for sanitation of the canal zone and of the city of Panama itself. Sewerage and drainage systems, and the introduction of an adequate supply of pure water, are held as imperative needs, no matter how much they may cost. Yellow fever is the plague most feared, but by improved sanitation and a thorough system of inspection, with occasional quarantine against La Guayra and other fever ports near by, there is little doubt that the health conditions among the many thousands of workmen who will soon be on the Isthmus may be made comparatively satisfactory. General Davis told a Congressional committee, a few days ago, that he thought the Isthmus could be made as healthful as Havana and other tropical cities, and that the Americans who go there need not suffer serious inconvenience if they only take care of themselves.

Dr. Spratling, Brigade Surgeon, who has been on the Isthmus with the American Marines, reports that there has not been a case of yellow fever, malaria, or any other disease peculiar to the region among his men, and he attributes their immunity largely to the fact that they drink none but distilled water. He says the general health conditions along the canal route are very much better than they are generally supposed to be. White men who have been on the Isthmus many years say that they have no trouble with fevers, but find it necessary to take good care of themselves. All the laborers now employed by the French company—four or five hundred in number—are Jamaica negroes, and their health is fairly good, considering their habits.

MRS. EDDY'S LOGIC.

Disease is a condition of matter, and is, therefore, an illusion; and the cure for it is the removal of the illusion. Therapeutics, evidently, is only secondary; and an attack in that direction to be effective must be aimed back at the philosophy. For Christian Science *therapeutics* is the truth if Christian Science ***philosophy*** is the truth; indeed, if Mrs. Eddy's premises be correct, her conclusion is the only consistent one. Fundamentally, Christian Science is a philosophy of Evil based on a philosophy of Knowledge, and its cure of disease is only incidental, even though identified in the popular mind with the system itself.

Mrs. Eddy's treatment of Evil—manifesting itself in the favorite trio: sin, sickness, death—is equally unsatisfactory from the

philosopher's point of view. The explanation of each is its n[illegible] existence; the origin of the illusion is simply neglected. He[illegible] for example, is a man from whom you have removed the hea[illegible] He is dead, according to our ignorant and loose use of the wo[illegible] "No," says Mrs. Eddy, "that statement shows a subjective il[illegible] sion." "Whence did this illusion arise?" I ask. "From custo[illegible] is the reply; "men have learned to associate the supposed abse[illegible] of a non-existent heart with the illusion death." "But," I s[illegible] "back in primitive times, before there were customs or major[illegible] opinions, before men had learned to connect the heart with life at all, what started the illusion death?" And there is absolute and ridiculous silence. She has done nothing more, you see, than define death—and the same holds true of sickness—in an unusual way; but incapable of a large vision, and ignorant of the distinction between proximate and ultimate causes, she persuades herself that she has really explained the mystery.—John W. Churchman, in the April "Atlantic."

THE CONTINUOUS EMISSION OF LIGHT AND HEAT BY RADIO-ACTIVE SUBSTANCES.

After learning that the radio-active substances, uranium, thorium and radium are, for some reason or other continuously projecting with enormous velocities two kinds of particles, the *alpha* and the *beta* particles, one is not surprised to find that these substances maintain a temperature above the temperature of the surrounding atmosphere. This has been proved experimentally only for radium, which was found last year, by M. Curie and M. Laborde, to remain permanently at a temperature between one and two degrees above that of its surroundings, and to give out for each grain of weight enough heat per hour to raise a hundred grams of water through one degree. Since radium radiates more than a million times more actively than either of the other substances, it is not likely that any one will ever be able to show experimentally that uranium and thorium also maintain a temperature above that of their surroundings. Nevertheless, the same causes which operate to hold up the temperature of radium, operate also to hold up the temperature of both the other radio-active substances, the only difference being one of degree. Hence it is probable that all radio-active substances are continuously emitting, in a greater or less degree, heat energy. This is not surprising in view of the conclusion that such substances are continuously projecting particles with enormous velocities, for if

those particles are projected from all the molecules of the active substance, it would be expected that the temperature of the mass of the substance would rise under this unceasing internal bombardment. But whence comes this energy which is represented in the projected particles, and of which this heat and light are the ultimate manifestation?—From "Recent Discoveries in Radiation and Their Significance," by Prof. R. A. Milliken, April "Popular Science Monthly."

THE SOUL?—ELECTRICITY TRANSFORMED.

Electricity is *not* matter. It is a *substance,* an element, capable of being changed into another element, as has been demonstrated by eminent English scientists. It pervades the whole system of created things, the air, the sea, the land, objects organic and inorganic, animate and inanimate, animals, plants, marine forms, insects and all the rest, manifesting itself transcendently in the lightning and in the aurora borealis, and extending beyond the confines of the universe into the unknown realm of the infinite. Matter rots, decays, perishes, but electricity is imperishable.

Hitherto the Creator has manifested Himself to mankind through material objects, because man is "of the earth earthly," and perceives with his physical senses. In his spiritual existence his faculties will be different, and he will see marvelous phenomena which are not perceptible now. Christ has promised this. Electricity is the connecting link between the material and the immaterial. It is the most potent, subtle, and mysterious of all palpable and impalpable media. Our carnal bodies are already charged with it: then why may not our spiritual bodies or soul-envelopes be composed of it entirely? "As the lightning cometh out of the east and shineth unto the west, even so shall the coming of the Son of Man be" (Matt., xxiv, 23).—Charles Hallock, in "The Open Court," for April.

GREAT WOMEN PIONEERS.

History has fully recorded the deeds of the men who have laid the foundations of this nation in the Western wilderness; but the women who shared with the men pioneers the dangers and hardships of the frontier have received little notice from either historians or novelists. A great deal of light is thrown upon the Great Women of Pioneer Times in a series of articles that is appearing in "The Delineator." The subject in the May number is Catherine Sevier. This remarkable woman took an important part in many of the stirring events of the times, and exerted a

powerful influence upon all with whom she came in contact. As the wife of an equally remarkable man she became the first lady in the "Free State of Franklin," and afterward the first occupant of the Gubernatorial Mansion of Tennessee.

THE LIBRARIANS OF NEW YORK STATE recently took a vote as to the best 50 books for a village library, among the 7,865 books published in America last year. Six more were thrown in for good measure, and of the 56 books selected, 14, or 25 per cent. were published by The Macmillan Company. The books selected are: "The Call of the Wild," by Mr. Jack London; Mr. Morley's "Life of Gladstone"; "A Woman's Hardy Garden," by Mrs. Helena Rutherfurd Ely; "The Heart of Rome," by Mr. F. Marion Crawford; "The Social Unrest," by Mr. John Graham Brooks; "Two Centuries of Costume in America," by Mrs. Alice Morse Earle; "A Descriptive Guide to the Best Fiction," by Mr. Ernest A. Baker; "The Mettle of the Pasture," by Mr. James Lane Allen; Mr. Sidney Lee's "Dictionary of National Biography"; "Queen Victoria: A Biography," by Mr. Sidney Lee; "Old Quebec: The Fortress of New France," by Sir Gilbert Parker and Mr. Claude G. Bryan; "People of the Whirlpool," by the Author of "The Garden of a Commuter's Wife"; "Studies in Contemporary Biography," by Mr. James Bryce, and "The Care of a House," by M. T. M. Clark.

THE VAUDEVILLE.

Few persons realize the magnitude of conducting a single vaudeville, but the manager of a circuit such as the Proctor Theaters, consisting of seven houses in four different cities, has at his command an army of no small proportions. Those actually employed in the stage performances average forty each week. To this must be added the property men, scene shifters, clearers, electricians, stage and assistant stage managers. There are from thirty to forty men throughout the auditorium to cater to the comfort and convenience of the patrons, possibly ten more employed as door-keepers and ticket-sellers, a business staff of from five to eight, and an orchestra of ten players. In addition to this there are three complete shifts of scenic artists employed on the paint bridges at the Fifth Avenue Theater, Fifty-eighth Street and One Hundred and Twenty-fifth Street theaters, a staff of fifty house painters and decorators, who are constantly going over the houses and keeping them in good condition; a dozen charwomen, and a host of advertising men, booking agents and others. These are all necessary in the presentation of a complete and per-

fect performance, and yet Mr. Proctor finds it profitable to present expensive bills at trifling admission fees, while paying the salaries of more than twelve hundred employees each week.

PRELIMINARY PROGRAM AMERICAN CLIMATOLOGICAL ASSOCIATION.

The twenty-first annual meeting of the Association will be held in the Banquet Room of the Aldine Hotel, Chestnut street, above Nineteenth, Philadelphia, on June 2, 3 and 4, 1904.

The Council recommends that papers should not exceed fifteen minutes in reading, and that members in discussion be limited to five minutes, unless special permission be granted; also, that members have duplicate copies of their papers, so that one copy may be deposited with the secretary immediately after being read.

The headquarters of the Association will be at the Aldine Hotel, where the morning and afternoon sessions of the first day, Thursday, June 2, will be held. At the close of the afternoon session there will be a trolley excursion to Willow Grove, where a collation will be served, and later there will be an opportunity of enjoying the music.

The sessions of Friday, June 3, will be held at Houston Hall, of the University of Pennsylvania, when a midday luncheon will be tendered by the Provost and Trustees of the University.

The annual dinner of the Association will be held at 7.30 p. m., at the Aldine Hotel. The contribution to the dinner has been placed at five dollars.

NEW YORK AT WORLD'S FAIR.

The Empire State's pavilion at the World's Fair is peculiarly appropriate in commemorating the event on which the holding of the Exposition is based. The building is patterned after the University of Virginia, which was designed by Thomas Jefferson, during whose administration as President of the United States the territory comprising the Louisiana Purchase was acquired from France.

The building is on the State plaza with the Illinois and Iowa buildings for neighbors. The land falls off about 25 feet on the easterly end, and it has been taken advantage of by the architect to place a large fountain in the façade of the podium or terrace on which the building stands. This fountain typifies the Mississippi River in the form of a river god controlling the sea.

The building proper stands on a podium enriched with balustrades and vases. It is colonial in design and detail, and is surmounted with a low dome. One enters a large hall, 60 feet square, running the full height, arched and domed in the Roman manner, with galleries around the second story. To the right is a large assembly hall, 50x60 feet, to be used on State occasions, but it is really made a part of the grand hall. Small assembly rooms are included in the end of this wing. To the left of the hall are waiting and writing rooms, with retiring rooms and toilets for visitors. The whole first floor is as one room, however, and with its colonnades and arches will present interesting vistas.

The second floor contains suitable rooms for the commission, the secretary and general officers. The halls and all of the appointments are most generous, and are to be treated in a simple, quiet manner. No effort will be made in the way of elaborate decorations, but the beauty of the whole will depend entirely on carefully studied detail and correct architectural lines. In the large hall, it is proposed to place four large paintings in the lunettes, symbolizing the four original ownerships—the Indians in one, Spanish, French and Americans in the others. The four pendentives will be filled with pictures emblematic of the four original States included in the purchase, and their products and manufactures. The external sculpture, while not expensive, will receive careful attention. The fountain, already described, and the four quadriga flanking the dome, will be modeled by representative sculptors, and will typify the march of progress. The building will be of staff.

One fact in connection with the original purchase will receive recognition in the way of tablets and inscriptions, and that is that Robert R. Livingston, of New York, who was Minister to France under Jefferson, negotiated the treaty with Napoleon for the Louisiana Purchase. He was empowered to negotiate for the mouth of the Mississippi River, and from this the purchase of the whole tract followed. Monroe, afterward President, resigned as Governor of Virginia to carry special instructions from Jefferson to Livingston in regard to the detail of the transfer.

Other details of interest will be the embodiment of the capitals designed by Jefferson with Indian corn as a motive. The grounds are to be made particularly interesting by New York nurserymen, who will exhibit the many varieties of flowers and shrubs grown in the State, and no detail is to be left unstudied to make the whole an artistic success.

THE SANITARIAN.

JUNE, 1904.

NUMBER 415.

METHODS AND INTERPRETATION OF WATER ANALYSIS.

BY A. ROBIN, M. D.,

Bacteriologist to City Water Department, Wilmington, Del.

The average consumer judges of the quality of the drinking water by means of his special senses of sight, smell and taste. Water which is turbid or emits a disagreeable odor is unreservedly condemned, while clear, sparkling water free from odor is just as unqualifiedly pronounced "pure." Those of us who are familiar with the history of typhoid epidemics and have had opportunity to examine drinking waters by means of special methods know how fallacious such a crude judgment is. Water that is clear and sparkling may contain the germs of typhoid fever or may be polluted with sewage which, in the course of decomposition, gave rise to carbonic acid. It takes many billions of bacteria to render a glass of water perceptibly turbid, and it requires considerable fresh sewage to impart to it a fecal odor. On the other hand, a turbid water, although objectionable from an esthetic point of view, may be entirely wholesome, and a disagreeable odor may be due to inoffensive vegetable compounds or harmless algæ.

This evident inability to form a ready judgment of the quality of a drinking water has led the sanitarian to seek the aid of the chemist, who, it was supposed, could readily detect by means of chemical analysis the injurious substances in the water under suspicion. However, it soon became evident that a chemical

analysis of water for sanitary purposes differs essentially from any other kind of analysis which the chemist may be called upon to make. The finding of arsenic or some poisonous alkaloid in a suspected fluid is decisive, and a report on such finding is merely a statement of fact. In the analysis of water, on the other hand, the findings are purely relative and must be properly interpreted before they can be of any value. A drinking water, if I may borrow the legal phraseology, is indicted on circumstantial evidence, and it depends on the erudition and ability of the chemist to so interpret and connect the evidence as to make out a clear case for or against the suspected water.

The object of a chemical analysis of water is to discover whether or not pollution with objectionable organic impurities has taken place. By "objectionable organic impurities" we understand those which are from human or animal sources and are capable of conveying the germs of disease. In other words, we look principally for fecal contamination, inasmuch as the germs of typhoid fever, cholera, dysentery and other intestinal disorders are excreted with the feces and together with the feces gain access to the water. By itself, organic matter in the minute quantities in which it is present in water, is not injurious to health, even if derived from sewage. It is only because this organic matter may be the carrier of disease germs that it becomes a matter of serious consideration. Therefore, organic matter derived from plants or vegetables removed from the possibility of infection with disease-producing bacteria has no significance from a sanitary standpoint, and its presence in drinking water in no way renders it unwholesome.

It is thus evident that the aim of the sanitary chemist is to discover, first, the presence of organic matter, which would indicate pollution, and, second, to determine the source of this organic matter. How well these two requirements are fulfilled by a chemical analysis will be made clear later.

Dead organic matter in water, as elsewhere, is not in a state of stability. Through the agency of certain bacteria, in the presence of oxygen, it continuously undergoes material changes, becoming resolved into simpler inorganic compounds. The nitrogenous substances are converted into ammonia, and the latter into nitrous and finally nitric acid, the two acids combining with bases usually present to form nitrites and nitrates, respectively. These changes may be best illustrated by the following scheme:

Organic matter { Carbon—Carbon dioxide. / Hydrogen / Nitrogen { Ammonia { Nitrous acid (Nitrites) / Water } Nitric acid (Nitrates).

This process, may it be remarked in passing, is a beneficial one, since by its means purification of polluted water is accomplished and the decaying organic matter converted into useful plant food.

These changes, under favorable conditions, take place incessantly so long as there is a supply of dead organic matter and the necessary bacteria are present. Therefore, the amount of organic matter in water represents that portion which has not yet undergone disintegration—the organic nitrogen or so-called albuminoid ammonia—as well as the various intermediary products of the portion which has undergone or is undergoing disintegration—free ammonia, nitrites and nitrates. The quantitative relation of these products of oxidation to each other as well as to the unoxidized nitrogenous matter will depend on the original amount of the organic matter and the rapidity with which oxidation has taken place. Therefore, an analysis which discloses these various stages of oxidation reveals also not only the presence but the retrogressive course of the organic matter. Given a water containing relatively large amounts of albuminoid and free ammonia, together with nitrites and nitrates, the indications would be that such water contains a large amount of organic matter in a state of incomplete oxidation; in other words, the contamination is recent. On the other hand, the presence of nitrates, in the absence of nitrites, with only small amounts of free and albuminoid ammonia, would indicate complete oxidation or a previous pollution. It goes without saying that pure water should contain only traces of albuminoid and free ammonia and should be free from nitrites and nitrates, the latter, if in small quantity, being rapidly appropriated by the water plants. It is to be expected that in deep wells removed from the possibility of pollution, the water will contain very slight amounts of ammonia and no nitrites or nitrates, or mere traces, although free ammonia may sometimes be present in large amounts as a result of oxidation of vegetable matter or nitrates by ferric oxide.

In addition to organic matter, water contains various salts, the most important and constant of which is sodium chloride, or, occasionally, magnesium and calcium chloride. These chlorides are derived from the sea or geological formations rich in salts. The

amount of chlorides will vary with the natural source and remains fairly constant. However, when the water is polluted with sewage or household refuse the chlorides will increase in proportion to the degree and nature of the pollution, and this increase serves as a reliable indication of past or present pollution. This index, however, is of value only when the normal chlorine contents of the water in question or of waters in the immediate neighborhood is known.

On the foregoing considerations are based the various methods employed in the chemical analysis of water. As these methods are fully described in books on the subject, I shall not dwell on them here, but will mention the modifications which I found useful in my work. For the determination of turbidity, free and albuminoid ammonia, nitrates, nitrites and iron I employ Jackson's standards, which are used in the Mt. Prospect Laboratory, Brooklyn, and are described by Mr. Jackson in the *Technology Quarterly,* Vol. XIII, No. 4, 1900. A constant use of the standards convinced me of their accuracy and convenience. They offer the great advantage of being always on hand and presenting a uniformity of composition (color) not attainable when the standards are made up extemporaneously. However, in the determination of turbidity I depart somewhat from Mr. Jackson's recommendations and make use of 100 c.c. XX tincture bottles, glass stoppered (W. T. & Co.) instead of 100 c.c. Nessler tubes. I found that by means of these bottles it is possible to determine the turbidity with much greater accuracy. In determining nitrates and nitrites I treat 200 c.c. of the water with an excess of precipitated and washed aluminum hydrate, decanting the clear supernatant fluid. This brings about complete decolorization of the water, a condition most desirable in the case of surface waters which are frequently colored, the color interfering with the proper determination of nitrites and nitrates. I do not determine the loss on ignition, for the reason that it is not a reliable method of determining the organic matter in the residue. When the latter is subjected to heat, the nitrates are decomposed and the chlorides volatilized to a considerable extent, while some salts retain the water of crystallization despite the heating. The loss on ignition, therefore, does not represent the amount of organic matter burned. I do, however, heat the residue, but only to observe the charring on ignition. The degree of charring of the residue does indicate, roughly, of course, the amount of organic matter.

UNRELIABILITY OF CHEMICAL DATA.

There are a number of serious objections to the data obtained by a chemical analysis. (1) Excessive free ammonia in ground waters may be the result, as has been mentioned, of the oxidizing action of iron or other metals on the nitrates present, while in surface waters it may be produced by the action of a fungus Crenothrix (Brown). (2) The nitrites found in deep-well water may be the result of the reduction of nitrates normally present in the soil, and, consequently, in no way represent organic pollution. One of the chief objections, however, is that a chemical analysis does not reveal the nature of the organic matter, whether of vegetable or animal origin. Admitting that a certain water contains an excess of organic matter, the question arises, Does this organic matter represent harmless vegetables or dangerous sewage? The chemist cannot answer this question with a certainty which would preclude a "reasonable doubt." Yet a water contaminated even with large amounts of vegetable matter, while not the best kind of water to drink, is, nevertheless, free from danger. It is true, that if the ammonia on distillation is given off rapidly and the nitrites and chlorine are excessive, the indications that the organic matter is derived from sewage are reasonably clear, but the rapidity with which ammonia even from animal matter is given off is only comparative and there is no way of gauging it, while the excessive amount of chlorine as compared with the normal chlorine standard of that particular locality presupposes a previous study of unpolluted waters which is seldom made and which often cannot be made.

The other objection, one of a much more serious nature, is that water may be organically pure and yet contain germs of disease. Instances are cited by a number of authors showing that water-supplies pronounced on chemical evidence to be above suspicion have been proved to have caused serious epidemics of typhoid fever or dysentery. Thus Dr. Thresh, in his well-known book on "Water and Water Supplies," cites a number of such instances, a few of which I will quote.

The water from the River Ouse, below where it receives the sewage of Buckingham, to which an epidemic of typhoid fever was attributed, was analyzed by the public analyst, who reported that it "does not appear from the analysis to contain sewage matter."

The Beverley water-supply, which became polluted with infected sewage from an asylum, giving rise to a typhoid epidemic,

was pronounced by the chemist to be "of a very high degree of purity, and eminently suitable for drinking and domestic purposes."

Analysis of water from the sewage-polluted Trent showed that "there is no evidence of the product of sewage contamination."

The well-water supplying Houghton-le-Spring became contaminated with sewage from a farm, causing a sudden outbreak of typhoid fever. The chemist who analyzed the water reported that "this water is very free from indications of organic impurity. . . . It is a good water for drinking purposes."

The reason for this evident failure on the part of the chemist to detect dangerous pollution is not difficult to find. A generally pure water may become contaminated with an amount of sewage too small to give evidence of its presence when polluted with several millions of gallons of water, yet this small amount of sewage may contain numerous specific germs, the presence of which cannot be detected by a chemical analysis. Again, the sewage may have undergone complete oxidation and the end products taken up by the plants, leaving no perceptible evidence of the pollution, while many of the specific germs which may have been present in the original sewage remain viable and capable of causing disease.

Before leaving this phase of the subject, I wish to point out the value of chemical analysis in comparing different waters in the same locality or a certain water at different times. In this connection, the data obtained by a chemical analysis are both accurate and valuable. Also in the study of filtration, especially of the slow-sand type, chemical analysis of the raw water and effluent made from time to time furnishes valuable evidence of the efficiency of the filter in removing turbidity and color, and bringing about the nitrification of organic matter which is the essential feature of this process of water-purification.

BACTERIOLOGICAL EXAMINATION.

With the advent of bacteriology, and especially after the introduction of Koch's plate method of isolation of bacteria, the hope of the sanitarian had been revived. It was supposed that at last we had a method by means of which we might detect the specific causes of disease in water, and thus place the examination of water on the same certain basis as the detection of poisons. With the knowledge that typhoid fever is usually caused by the drinking water and after the discovery by Koch that cholera is of similar

origin, it was expected that the typhoid bacilli and the cholera spirilla could be detected in the suspected water. Unfortunately, disappointment followed all attempts in this direction. It soon became evident that while a certain water has been the cause of either a cholera or typhoid epidemic, as established by all evidence at hand, neither the cholera spirillum nor the typhoid bacillus could be detected in such waters. The cause for this failure was found in the great predominance of water bacteria which overgrow and obscure the few specific parasites, rendering their discovery impossible. The effort may be compared to looking for a needle in a haystack. While not entirely abandoned, the search for specific microorganisms has not been made the object of routine examinations; and until some satisfactory method is devised by which the saprophytic bacteria may be entirely eliminated and the number of the specific microorganisms increased so as to have them present in very small quantities of the water, the bacteriologist must depend upon other data upon which a conclusion as to the quality of the water may be reasonably based. It was thought for a time that the number of bacteria in the water could serve as an index of pollution, and a number of standards of bacterial purity have been suggested by various authorities. Thus, Koch considers 100 bacteria per cubic centimetre as the safe limit for drinking water; Miquel raises the standard to 1,000; Crookshank agrees with this standard, while Macé and Migula claim that 250 to 500 bacteria is the highest limit for a good drinking water. These or any other arbitrary standards based on mere number of bacteria are as fallacious as the "standards" proposed from time to time for ammonias, nitrites, nitrates, etc. In the first place, the number of bacteria in water will vary greatly with the medium, the reaction of the medium, the length of time the colonies are allowed to develop, dilution, etc., as may be seen by the following data:

(1) *Time of Plating.*—It makes considerable difference whether the water is plated immediately upon collection or is allowed to stand for some time before plating. At room temperature, the bacteria multiply enormously, so that if the plating is done several hours after collection of the sample, an originally pure water may be condemned on the bacterial count. On the other hand, if packed in ice, the bacteria decrease in number sometimes to a very marked degree. This is clearly shown by Jordan and Irons (*Trans. Am. Pub. H. Ass.*, Vol. XXV, 1899) in the following table:

	A.		B.		C.	
	Temp. C°.	No. Bacteria per 1 c.c.	Temp. C°.	No. Bacteria per 1 c.c.	Temp. C°.	No. Bacteria per 1 c.c.
Immediately after collection	20.75	176	23.5	950,000	29	385,000
After 3 hours	9	123	9	510,000	29	.....
" 6 "	6	93	6	90,000	(4 hrs.) 66	130,000
" 11 "	8	87	6	430,000	(8 hrs.) 2	210,000
" 24 "	7	72	7	380,000	(22 hrs.) 6	136,000
" 32 "	8	46	8	340,000	.....	.....
" 49 "	4	27	2.5	429,000	(46 hrs.) 8	305,000
" 72 "	1	39	3.5	480,000		

This marked decrease the authors ascribe to the effect of sudden chilling.

(2) *Dilution.*—It is by no means a matter of indifference whether the water is plated as it is or diluted; also the degrees of the dilution employed has an effect on the number of bacteria per 1 c.c., as shown by Jordan and Irons (*l.c.*) in the following table:

A		B	
Undiluted	218	Diluted 1-1,000	844,000
Diluted 1-10	470	Diluted 1-10,000	2,630,000
		Diluted 1-100,000 ...	4,300,000
C		D	
Undiluted	1,500	Diluted 1-1,000	479,000
Diluted 1-10	4,340	Diluted 1-10,000	1,120,000
Diluted 1-100	8,800	Diluted 1-100,000 ...	1,300,000

This variation in number, dependent on dilution, is due to the obscuration of colonies through inhibition of growth when undiluted water is plated. In the matter of dilutions, the number and vigor of shakes to which the vessel is subjected before the 1 c.c. is withdrawn affects the numerical results, also whether distilled or tap-water is used as a diluent. The method I employ is to have on hand 50 and 100 c.c. graduated flasks half-full of tap water. These are sterilized in the autoclave. One cubic centimetre of the water is added to either the 50 or 100 c.c flask, and contents subjected to ten vigorous shakes. The flask is then filled to the mark with sterile tap-water and inverted twenty-five times. If higher dilutions are required portions of diluted water are similarly treated.

(3) *Composition of Media.*—That the constituents, reaction and character of the medium influence the number of bacteria to a very great extent is a well-known fact attested by numerous experimental data. The marked variations in the number of bacteria in the same water plated on different media is shown by the following data obtained by Jordan and Irons *(l. c.)*:

(1) SURFACE WATER (LAKE MICHIGAN).

	Reaction (Fuller's scale).	*No. of Colonies. Eight days.*
Ordinary Witte's peptone agar	+10	50
Ordinary Witte's peptone gelatin ...	+10	130
Somatose gelatin (no broth)	0	110
Nährstoff Heyden gelatin (no broth)	0	460
Somatose agar (no broth)	0	470
Nährstoff Heyden agar (no broth).	0	570

(2) SURFACE WATER (MISSISSIPPI RIVER).

	Reaction. (Fuller's scale).	*No. of Colonies. Seven days.*
Ordinary Witte's peptone agar	+10	206
Somatose agar (no broth).....	0	543
Nährstoff Heyden agar (no broth) .	0	612

(3) SEWAGE (DILUTED $\frac{1}{10000}$).

	Reaction. (Fuller's scale).	*No. of Colonies. Ten days.*
Witte's peptone agar	+10	127 127
Somatose agar	0	198
Nährstoff Heyden agar.....	0	355 342

(4) GROUND WATER (ARTESIAN WELL).

	Reaction. (Fuller's scale).	*No. of Colonies. Nine days.*
Ordinary Witte's peptone agar	+10	15
Ordinary Witte's peptone gelatin ...	+10	21
Nährstoff Heyden gelatin	0	700
Somatose agar.....	0	584
Nährstoff Heyden agar	0	920

Equally marked variations were obtained by Gage and Phelps (*Centralbl. f. Bakt., Paras. u. Infek.*, Abt. 1, Bd. xxxii, No. 12, 1902; *Trans. of the Am. Pub. H. Ass. of the Twenty-ninth Annual Meeting*, 1901). They experimented with thirteen different media and various waters. Fuller and Johnson (*Trans. Am. Pub. H. Ass.*, Vol. XXV, 1899) experimented with a medium composed of meat infusion and 12 per cent. gelatin, omitting the peptone and salt, with the following comparative results:

NUMBER OF BACTERIA PER CUBIC CENTIMETRE.

Reaction (per cent).	Regular Nutrient Gelatin.	Meat Infusion and Gelatin.
0.0	110	200
0.5	110	210
1.0	120	100
1.5	80	130
2.0	75	70

This table also shows the effect of the reaction. The optimum reaction in this case was + 0.5 for the meat infusion gelatin and + 1.0 for the regular nutrient gelatin. The optimum reaction, however, will differ with different waters. Generally + 10 to + 15 (Fuller's scale) is recommended. In my own experimental work I found equally striking variations as shown in the table below.

The gelatins Nos. 1 and 9 were prepared according to the directions given by the Laboratory Committee of the American Public Health Association on Standard Methods. Gelatin No. 2 was prepared in accordance with the same method, with the exception that Armour's extract of beef was used instead of meat. The reaction in each case was + 15. An extended series of observations on the Gelatins Nos. 1 and 2 showed that the latter invariably gave twice the number of bacteria.

(4) *Condition of Cultivation.*—An atmosphere saturated with moisture, as shown by Whipple (*Technology Quarterly*, Vol. XII, No. 4, December, 1899), favors a greater development of bacteria. The temperature also plays an important role, since fewer bacteria will develop at 10° C. than at 20° C. The difficulty of maintaining a constant low temperature is well known.

(5) *Length of Cultivation.*—The day on which the colonies are counted influences the numerical results, perhaps, more than any

other factor. Given a certain medium and environment, some species of bacteria will develop more rapidly than others. I could

Series.	Medium.	Day of Count.	No. Bacteria per 1 c.c.
A	Gelatin No. 1	2	3,000
	Gelatin No. 2	2	8,000
	Nährstoff Heyden agar	10	55,000
B	Gelatin No. 1	2	10,000
	Gelatin No. 2	2	24,000
	Nährstoff Heyden agar	10	30,000
C	Gelatin No. 2	2	87,000
	Nährstoff Heyden agar	10	172,000
D	Gelatin No. 2	2	70,000
	Nährstoff Heyden agar	10	108,000
E	Gelatin No. 2	2	8,000
	Gelatin No. 2	2	14,000
	Nährstoff Heyden agar	10	53,500
F	Gelatin No. 1	2	2,350
	Gelatin No. 2	2	4,800
	Gelatin No. 9	2	2,150
	Nährstoff Heyden agar	10	8,850
G	Gelatin No. 1	2	2,050
	Gelatin No. 9	2	4,750
	Nährstoff Heyden agar	10	34,500

illustrate this fact by numerous instances, but will cite only a few from my own records:

Gelatin plates,	third day count	3,050
" "	fourth day count	5,350
" "	third day count	4,750
" "	fourth day count	12,150
" "	second day count	8,000
" "	third day count	50,000

Gelatin plates,		second day count	2,350
"	"	sixth day count	4,500
"	"	second day count	4,800
"	"	sixth day count	13,150
"	"	second day count	2,150
"	"	sixth day count	7,350
"	"	second day count	2,050
"	"	sixth day count	11,000

The committee of the American Public Health Association on Standard Laboratory Methods recommends that plates be counted on the second day. The difficulty, however, of establishing a uniform practice lies in the variability of saprophytic bacterial species not only in different waters, but in the same water at different times. Thus a certain water may contain species which develop rapidly at 20° C., while another water, or the same at another time, may contain species which develop slowly at that temperature. As a matter of fact, waters containing large numbers of bacteria whose optimum temperature is 37° C. (fecal and other pathogenic organisms) will show a lower count, owing to the fact that these species develop slowly at 20° C., and the colonies could be readily overlooked on the second day count. In the case of testing the efficiency of a filter, the difficulty is augmented by the fact that the raw water does not contain, in point of numbers, the same species as does the effluent. On the other hand, prolonging the final count to the third or fourth day endangers the integrity of the gelatin plate, which often becomes liquefied at the end of the second day, unless kept at a temperature lower than 20° C., when the error, occasioned by a still lower temperature, is introduced.

The investigations of others, as well as my own, demonstrate conclusively that Nährstoff Heyden agar permits the development of the maximum number of bacteria, very likely all the bacteria found in a given quantity of water. This medium, according to Hesse and Niedner, who were the first to suggest it (*Zeitschr. f. Hyg.*, Vol. XXIX, p. 454) is prepared as follows:

	Per cent.
Agar-agar	1.25
Nährstoff Heyden	0.75
Distilled water	98.00

The Nährstoff Heyden, which is an albumose, is dissolved in water, mixed with the agar and the whole boiled until the agar is completely dissolved. It may then be filtered through absorbent cotton. The medium requires no adjustment of reaction, nor any other manipulations which, in the case of other media, interfere with the uniform composition of the finished product. Nährstoff Heyden agar is of uniform composition, and offers the additional advantage that the colonies developing on it never spread nor grow so large as to obscure their smaller neighbors. The plates are usually counted on the ninth or tenth day, although the count may be made on the fifth or sixth day without any great error being introduced. The colonies developing on this medium are, as a rule, not characteristic, but chromogenesis is brought out remarkably well. A plate containing a number of chromogenic species looks like a field bedecked with early spring flowers. It is quite likely that this medium may prove of great use in the grouping of bacterial species according to chromogenesis.

But even if in Nährstoff Heyden agar we possess a medium which will show all the bacteria found in a given sample of water, we are still unable to pass definite judgment on its hygienic quality. After all, the number of bacteria in water indicates the presence of bacterial food, or organic matter, but does not reveal to us the nature of that organic food, whether of vegetable or animal origin. Therefore, the same objection that is raised against the chemical analysis of water pertains with almost equal force to the mere counting of the number of bacteria. To remedy this defect, bacteriologists introduced the presence or absence of B. coli communis, a normal resident of the intestinal tract of man and animals, as the criterion for the presence or absence of fecal pollution. The presence of the B. coli communis indicates the presence of feces, and the contamination with the latter makes it possible for the typhoid bacilli to be present. Consequently, the investigation of water supposed to have been the cause of a typhoid epidemic rests on the presence of the colon bacillus as the indirect but certain evidence. However, the mere presence of the colon bacillus, which is so widely spread in nature, is no certain indication of fecal pollution, unless the number of B. coli is large. Unfortunately, the methods for the enumeration of this microorganism are either too complicated for routine work or inaccurate; and, besides, bacteriologists are not quite agreed as to what constitutes a genuine B. coli communis, there being a number of species not found in feces which closely resemble it.

It would seem from the foregoing considerations that we possess no certain means of detecting dangerous pollution in cases in which a mere sanitary inspection does not make the source of the pollution evident (proximity of privy, discharge of sewage into the stream, etc.). Fortunately, however, this is not the case. While it is true that no single factor establishes definitely the character of the water under suspicion, a combination of factors with their proper grouping and interpretation is capable of forging a chain of evidence, placing the verdict "beyond a reasonable doubt." The procedure, which will yield satisfactory results, is as follows:

The water is subjected to a chemical analysis, and an adequate portion, 1 c.c. or a fraction of a cubic centimetre, plated in gelatin, Nährstoff Heyden agar, litmus lactose agar, carbolic acid lactose agar and neutral red lactose bouillon.* The carbolic acid lactose agar is made by the addition to 5 c.c. of the medium of 0.05 — 0.1 c.c. of Parietti's solution (hydrochloric acid 4 c.c., 5 per cent. carbolic acid solution 100 c.c.). The neutral red lactose bouillon is made by adding 10 c.c. of a 1 per cent. solution of neutral red to 1 litre of lactose bouillon (1 per cent.). The gelatin and Nährstoff Heyden plates are kept at 20° C., and the others at 37° C. The gelatin plates are counted at the end of two days, the Nährstoff Heyden agar plate at the end of nine days, the litmus lactose agar plate at the end of twenty-four hours and the carbolic acid lactose agar plate at the end of forty-eight hours.

Interpretation of Results.—By using these several media we aim to demonstrate: (1) The presence of organic pollution by the combined chemical analysis and bacterial count, the count on gelatin serving as a comparate with the counts obtained by other observers who have used gelatin, while the Nährstoff Heyden agar shows the total number of bacteria.

(2) The presence and number of bacteria which develop at 37° C. and the presence and number of red colonies which may be either B. coli communis, Houston's streptococcus or some other sewage organism producing acid. This information is furnished by the litmus lactose agar plate.

(3) The presence and number of bacteria which resist the addition of carbolic acid, as B. coli communis or some other equally resistant microorganism which could not be an ordinary water saprophyte. This is indicated by the carbolic acid lactose agar.

(4) The absence or possible presence of B. coli communis as in-

*The neutral red lactose bouillon was suggested by Dr. Stokes, of the Baltimore City Board of Health, at the meeting of the American Public Health Association, at Washington, D. C., 1903.

dicated by the production or non-production of gas and characteristic reaction with the neutral red dye.

Given a water which shows on chemical analysis organic pollution and which shows a large number of bacteria on gelatin and a considerable number of bacteria on the litmus lactose agar and Parietti's solution lactose agar plates together with red colonies on the former and production of gas plus characteristic reaction with the neutral red in the neutral-red lactose bouillon, such a water may be pronounced polluted with sewage, beyond a reasonable doubt.

The practical application of this method is illustrated in the following instance.

Water from the race carrying Brandywine water was examined with the following results (in 1 c.c.):

No. of bacteria on gelatin, second day count..... 1,000
No. of bacteria on Nährstoff agar, tenth day count 9,000
No. of bacteria on litmus lactose agar, twenty-four hours.. 57
No. of red colonies (proved to be B. coli) 8
Neutral red lactose bouillon (1 c.c. of water), typical reaction.

At the same time the water from the Cool Spring Reservoir, containing the same water, was examined and showed (in 1 c.c.):

No. of bacteria on gelatin, second day count..... 3,400
No. of bacteria on Nährstoff agar, tenth day count 75,000
No. of bacteria on litmus lactose agar, twenty-four hours... 26
No. of bacteria on red colonies 1
Neutral red lactose bouillon (1 c.c. of water) showed production of gas without characteristic change of color.

Subsequent study of the single red colony showed that it belonged to the proteus group.

At another time the race-water showed (in 1 c.c.):

No. of bacteria on gelatin 13,000
No. of bacteria on lactose litmus agar 97
No. of red colonies (proved to be B. coli)..... 33
No. of bacteria on carbolized lactose agar 46
Neutral-red lactose bouillon, typical reaction.

The water from the reservoir showed (in 1 c.c.):

No. of bacteria on gelatin	16,350
No. of bacteria on lactose litmus agar	37
No. of red colonies (proved to be B. coli)	7
No. of bacteria on carbolized lactose agar	37

Neutral-red lactose bouillon, typical reaction.

The Brandywine water is an extremely polluted stream, receiving the sewage from Coatesville and other places. The water in the reservoir receives but little sedimentation and is drawn near the bottom. We would expect, then, that the water from the reservoir would contain more saprophytic bacteria, while the race-water would contain more sewage organisms. This is admirably demonstrated by the above examinations. Yet, were we to depend on the bacterial count on gelatin alone, the reservoir-water would appear many times worse than the race-water. It is thus seen that by the proper combination of laboratory methods a definite and accurate conclusion may be reached, and it is also evident that in the examination of water reliance on any single method will lead to grave errors.—"American Journal of Pharmacy," March, 1904.

INTERNATIONAL PREVENTION OF EPIDEMICS.—From October 10 till the beginning of December, 1903, meetings were held in Paris for the purpose of devising the best means for the prevention of epidemics. The meetings had adopted the name of an "International Sanitary Conference." The first object was to agree upon a period of observation time in case of suspected plague. Up till now it had been deemed necessary to keep human beings and freight suspected of infection by plague bacilli under close observation for ten days. The conference arrived at the conclusion that the period can be reduced to five days. It was the aim of the conference on the one hand to find the best possible guaranty for the public health, but on the other hand to choose the measures for this purpose so as to interfere with international commerce in the least degree. For the present only the principles for prevention of plague and cholera were discussed. Before adjournment a motion was made to create an international health board as a permanent institution, having its main office in Paris.—Richard Guenther, Consul-General, Frankfort, Germany, December 22, 1903.

RELATIVE PREVALENCE OF CONTAGIOUS DISEASES IN CHILDREN OF SCHOOL AGE.*

By P. H. BRYCE, M.A., M.D., Ottawa.
Late Secretary Provincial Board of Health of Ontario, Medical Inspector of Immigration and of the Department of Indian Affairs for the Dominion Government.

To everyone, but especially to those interested in the care of the children of our public schools, the subject of this paper becomes of extreme importance.

We naturally are all interested in the question of the prevention of contagious diseases among children at all ages, and in the measures by which such prevention may be accomplished; and it is natural to inquire how far schools are an aid or hindrance to such prevention. In one sense our schools are both an aid to the dissemination, and a means of preventing the spread of contagious disease. They do aid in the dissemination of disease in the same way that infection spreads among crowds everywhere; but they are a means of prevention through the educational influences which spread often from the children to parents, in these days of general compulsory school attendance and instruction in hygiene. Not until the organization of the Department of Health under the local government board in England was there any systematized study of the causative influences of the spread of infectious diseases; but since the appointment of Dr. John Simon, its first medical officer, investigations have been pushed in every direction. This is illustrated in the following quotation from Dr. Clifford Allbutt's "System of Medicine":

"The influence of school attendance on the diffusion of diphtheria was noted almost as soon as skilled inquiry into the circumstances of the disease was instituted. This was pointed out by Mr. W. H. Power in 1876, and in the following year I had an opportunity of studying the matter during a maintained prevalence of diphtheria at Coggeshall in Essex. It was found practical to divide the 928 children in the village into age-groups, and then to ascertain within each group the relative amount of diphtheria, in

*Read at Conference on School Hygiene and Education, February 2nd, 1904.

those who attended school and those who did not. Under three years of age school attendance was not found to have materially influenced the number of attacks, but in the age period three to twelve years, the incidence of the disease was not far from 50 per cent. greater on school attendants than on others: and in the age period twelve to fifteen years the school attendants suffered nearly three times more than those who were not at school."

A similar result in the instance of scarlet fever is illustrated in the Annual Report of Dr. Murphy, Medical Officer of Health of London, England, for 1893, in connection with 17,704 cases. Of these there were: 5,279 cases under five years of age; 6,727 cases under ten years of age; 3,187 cases under fifteen years of age; or but 29 per cent. of the cases were under five years of age.

Dr. Murphy illustrated the fact in another way by showing how the prevalence of this disease declined with the summer vacation. Thus, under three years the decrease was 1 per cent.; under three to twelve years the decrease was 26 per cent.; over thirteen years the decrease was 13 per cent. Increase in succeeding months: under three years, 4 per cent.; under three to thirteen years, 65 per cent; over thirteen years, 26 per cent.

Such is the experience of officers of health in England; but we are able to further illustrate the prevalence of infectious disease from our own statistics.

During the first half of 1897, we had a serious prevalence of scarlet fever in Toronto. There were in all 1,138 cases and 63 deaths.

In the returns for May, and up to the 5th of the following June, there were in all 280 cases. Of these 198 attended school, or 70 per cent. of the whole were school children.

Such are the statistics of several outbreaks in which the details regarding cases have been available. We have, however, in addition to this, always available, the study of the death-returns from year to year for the whole province, and for particular municipalities.

The following table, from the Registrar-General's Report of 1900, supplies a number of interesting details, by which comparative results may be obtained. It gives the population of the province by age periods from nought to nineteen years, inclusive, by years for the first five-year period, and for the three succeeding quinquennia. It further gives the deaths for each of the several periods separately for scarlatina and for diphtheria.

Age period	0-1	1-4	0-4	5-9	10-14	14-19	5-19
Population	49,500	190,347	239,847	246,610	243,277	232,073	.....
Population percentage	5%	19.9%	24.9%	25.8%	25.29%	24.13%	.....
Total deaths	7,163	1,989	9,152	803	563	923	2,289
Total deaths from scarlatina	18	91	109	39	10	3	52
Total deaths from diphtheria	77	330	407	205	66	29	300

From the columns of totals we find that for the first quinquennium, the deaths for both diseases together were 516, and for the period of five to twenty, the legal school period, they were 352, and in the five to nine period separately, 244.

It will be observed that the ratio of deaths in the first five years of life is about three times that in the second five-year period for scarlatina, and twice that for the same period in the case of diphtheria. We see in this an apparent disagreement from the foregoing statistics regarding the cases as reported in the different illustrated statistics given.

There is, however, a natural explanation for this in the fact that the percentage mortality of scarlatina in England in 14,000 cases between 1888 and 1893 under five years was 16.8 per cent., while that for the five to nine year period was 5.6 per cent.

In the same way diphtheria which, between 1895 and 1899, had 25.6 per cent. of deaths in cases of children under five years, had 14.6 per cent. of deaths for the five to nine period. Or there were 1,536, as compared with 695. What is very pleasing to notice, however, in this study of English statistics, is the relatively great decrease in recent years, not only of the total cases and total mortality, but also of the lessening percentage in school children, due doubtless to the closer inspection of school children, and the very general removal of first cases to the isolation hospitals.

To conclude this reference to the relative prevalence in the two periods through illustrative statistics, I shall take the returns of our two largest cities, Toronto and Ottawa, for 1903. Except for the first three months of the year, the following are the number of cases, as well as deaths, for the year 1903. We find that for the ten months from March to December, Toronto had 418 cases of scarlet fever and 62 deaths, and 806 cases of diphtheria, with 100 deaths. The deaths for the whole year by ages are seen in the following table:

Ages.....	0-1	1	2	3	4	5-9	10-14	15-19	20-24	25-29	40-44	60-69	Not given.	Total
Scarlet Fever..	4	7	12	14	7	32	10	2	2	1	1	....	....	92
Diphtheria.....	7	9	22	18	20	44	7	1	4	1	....	1	2	136
Diphtheria and Scarlet Fever	..	..	3	1	..	3	1	....	....	....	....	....	....	8

Comparing cases with deaths as given, we find that the percentage death rate was 14.7 for scarlatina, and that for diphtheria was 11.7. I have not the figures enabling us to determine the death-rate at different periods, but we may assume that the relative rates would be much the same as in other years and places.

We find for scarlet fever that in the nought to five period the deaths were 44, while those for the school period, five to nineteen, were exactly the same. Applying the rate in the London Report, this means that there were three times as many cases among children of school age as in those from nought to five years.

For diphtheria it would appear that the record for children of school age is more favorable. Assuming that the London rates prevailed of two to one for the two periods, we find the prevalence in the schools to have a ratio only 50 per cent. greater than that for the nought to five year period.

The following table illustrates the relative prevalence in the city of Ottawa:

Ages	0-1	1	2	3	4	5-9	10-14	15-19	20-24	Total
Scarlet fever			1	1		2		1		5
Diphtheria	3	4	6	6	3	5	2		1	30

From the figures here given for scarlet fever, we similarly conclude that the prevalence of cases among the school children was three times as great in the five to nine period as in the nought to five year period; but we find that in the matter of diphtheria there is by no means the same relation, there being twenty-two deaths in the nought to five period, and but five in the five to nine period.

These figures are of extreme interest since they represent the results of a year's work, where for nine months all cases of diphtheria were removed to the isolation hospital so soon as diagnosed and the school children of the rooms, where cases had been, were inspected till the period of incubation was over. The very considerable number of cases which occurred during the year (320 scarlatina and 351 of diphtheria) removes the element of incorrect deductions which may result from a small number of cases.

The history of these Ottawa figures as a statistical study is most interesting. For years the city had an unenviable reputation in the matter of contagious diseases. In 1902, there were in all 689 cases of scarlet fever and 234 of diphtheria. In February, 1903, a new well-equipped isolation hospital was opened, and after March all cases of the diseases occurring in the city were sent to the hospital. Of the 320 of scarlet fever, 198 were treated in the new hospital during the eleven months; the balance, 102, were treated else-

where, or after the complete removal to hospital of all cases began, there were for the nine latter months of the year but 159 cases compared with 161 in the first three months.

Of the diphtheria cases (251 cases), 69 occurred in the first three months of the year, and 182 in the latter nine months, during which all cases were treated in the hospital. While not directly bearing on this subject, it is pleasing to remark that the total deaths for the nine months from scarlet fever were but three, while those from diphtheria were nine, or 1.52 per cent., and 4.9 per cent. of the cases. Such a low record of deaths for so large a number of cases has, so far as I know, never hitherto been obtained. But the other important point is the effect of the removal to hospitals of first cases in lessening the prevalence of the disease. In 1902 there were 689 cases of scarlet fever in Ottawa with thirty-nine deaths, and 487 cases of diphtheria. As a matter of fact, there has resulted from the more effective methods adopted in 1903, a reduction of over 50 per cent. in the cases of scarlatina and 85 per cent. of deaths, and 41 per cent. in the cases of diphtheria, and 54 per cent. of deaths.

But little more, I think, need be said on the subject, as the methods for dealing with infectious diseases in schools will be dealt with in another paper. To me, and I think to every one, it must be apparent that practically there is no limit to the economic and life-saving results which public health work, moving along the lines of experimental science, is capable of. What it is apparent is necessary is:

1. A conviction arrived at by such statistics as have been cited that disease is disseminated in such ways as I have indicated.

2. That we be convinced by the results of such methods as have been especially illustrated by the Ottawa statistics, that an enormous saving of cases of disease and deaths is possible.

3. That we possess scientific methods so certain when persistently and systematically carried out, that they will suppress outbreaks of epidemic disease almost with the same certainty as the demonstrated amount of work which a properly constructed machine will perform with the combustion of a definite weighed quantity of fuel. All that is further required is to educate the public that such work is life-saving and patriotic, and that, like all other philanthropic work, the results are not only good to the receiver, but also to the giver. As Sir Launfal, in his search for the Holy Grail, came to realize:

"The Holy Supper is kept, indeed,
In whatso we share with another's need;
Not what we give, but what we share;
For the gift without the giver is bare;
Who gives himself with his alms feeds three:
Himself, his hungering neighbor and me."

—"Canadian Journal of Medicine and Surgery," March, 1904.

THE WEAR AND TEAR OF LIFE—NEURASTHENIA.

By GUTHRIE RANKIN, M.D., M.R.C.P., of London,
Physician to the Dreadnought Hospital, Greenwich; Senior Assistant Physician to the Royal Hospital for Children and Women, Waterloo Road.

The term "neurasthenia" was first given in 1879 by Beard, of New York, to a group of symptoms which, though sometimes ill-defined and always capable of infinite variation, yet retain a general relationship which serves for the groundwork of a disease entity, little understood and never described before Beard's time but through his investigations and those of many successors nowadays universally recognized as a formidable enemy of mankind. Speaking generally, neurasthenia may be regarded as a derangement of function resulting from exhaustion of nervous energy. The causes upon which it depends are varied and often obscure, but, despite the testimony of contrary opinion, it can scarcely be denied that the increasing wear and tear of life at the present day probably plays the most important part in its etiology. It is not suggested that the greater pace at which the world moves is the sole explanation. The disease has probably existed from the remote ages, but it seems unlikely that it can have been prevalent in the earlier period of the world's history, else it could not have escaped description at the hands of the many eminent clinical observers of ancient days. And even coming down to recent times, it will be admitted by most physicians that in their individual experience the number of cases which they are compelled to classify as neurasthenics is infinitely greater than a few years ago; that it is one of the disorders which in its prevalence has become fashionable enough to be designated "the disease of the century"; and, most noteworthy of all, that its victims are to

be found in far greater abundance among the restless inhabitants of busy communities and large centers of industry than in country districts where life is passed under conditions of uneventful monotony, and of prosaic, unexciting occupation and duty.

Cases occur in rural as well as in urban districts, but the former bear but a small proportion to the latter, and are usually found to have been determined by a definite cause, such as an accident, adversity, or mental shock. The dweller in town, on the other hand, frequently develops all the classical features of the disorder without any unusual occurrence in his life or circumstances to account for it. He has been living his ordinary, every-day existence; but this is one of continuous high pressure, and ultimately his staying power becomes overtaxed, and terminates, without the development of organic disease, in a functional wreckage which is the expression of Nature's revenge for the lack of due attention to her imperative demand that rest as well as work is necessary for the maintenance of the *mens sana in corpore sano.* But the fault does not always or wholly lie at the door of a badly regulated life. The original capital of nervous force with which humanity is endowed is not the same for every individual. One man is descended from ancestors who have been proverbially healthy, and have most of them attained long lives; another is the inheritor of a nerve instability which has manifested itself either in his immediate or remote progenitors in various forms of mental trouble or nerve disorder. Obviously, the latter individual has a serious handicap to begin with, and is more likely than the former to break down under the stress of work and worry.

To all who are exposed to excessive and prolonged attacks upon the citadel of their vitality, capitulation of their resistive power may follow at any moment, and unless such early warnings of waning energies as sleeplessness, incapacity for mental concentration, physical languor and disturbed digestion are given heed to and counteracted by proper means, the sufferer will inevitably find himself ere long in the midst of neurasthenic tribulations, from which it will be tedious and difficult for him to emerge. A short period of rest and leisure may, if adopted in time, restore a life which would otherwise become miserable to its possessor and wholly unequal to its daily task of usefulness and healthy activity.

The disease is widely distributed, and, though specially prevalent in America, is met with in all the civilized countries of both hemispheres. "It is," says Proust, "equally spread among all civilized peoples in whom the struggle for existence keeps up an

incessant and exaggerated exaltation of the functions of the nervous system. To-day every one endeavors to raise himself higher than his ancestors; competition has increased; conflicts of interests and persons have multiplied in all conditions of life; free course is given to ambitions that are often little justified; a crowd of individuals impose on their brains a work beyond their strength; then come cares and reverses of fortune, and the nervous system, under the wear and tear of incessant excitation, at last becomes exhausted."

We are still in ignorance of the pathological conditions underlying the disease. It is seldom a direct cause of death, and therefore very few opportunities have arisen for *post-mortem* investigation. In a small number of traumatic cases where death has ensued, punctiform hæmorrhages have been found scattered throughout the brain and cord, but these cannot be looked upon as necessarily explanatory of the symptoms. Various theories have been advanced to satisfy the clamorings of our ignorance, but none of them is wholly satisfactory.

Bouchard attributes the disorder to abnormal fermentations in the stomach which, in virtue of heredity or congenital weakness of its muscular coat, contracts insufficiently in the intervals between different periods of digestion. Under these circumstances he believes that soluble toxins are produced which, when reabsorbed impair the anatomical elements of the different organs, and notably those of the nervous centers.

Another theory suggests that the disease is due directly to vitiation of nutrition, the result of imperfect digestion. The dyspepsia need not, according to the advocates of this hypothesis, be necessarily associated with gastric dilation, but it produces, sooner or later, anæmia, which in turn gives rise to depression of the nutritive activity of all the tissues of the body, and more particularly of the nerve elements.

Glenard has endeavored to explain both the dyspepsia and the neurasthenic symptoms by a sinking of the viscera in the abdominal cavity; but, though enteroptosis exists in a certain number of cases, it is the exception rather than the rule.

The prominence of vasomotor phenomena in the symptomatology of the disease has led to a suggestion that low blood pressure, causing an overloading of the portal circulation and an imperfect filling of the heart, may be the responsible pathological factor in the etiology.

The frequent association of neurasthenia with Graves' disease

osteo-arthritis, and the menopause in women—in all of which vasomotor disturbance plays a prominent part—lends some apparent likelihood to such a theory; but, in the light of recent research, it may well be asked whether all of them are not due to one or more toxic influences which have yet to be discovered.

Whatever the ultimate nature of the pathogenic origin of neurasthenia may prove to be, the functional disturbances which the disease produces appear to depend upon some primordial alteration of the nerve cells which we do not yet understand.

In its incidence, neurasthenia is most frequently met with between 20 and 40, though it may set in at almost any age. It attacks men more frequently than women, and is especially apt to affect those of neurotic inheritance, or those who live under conditions of mental or physical tension. All forms of excess predispose to its occurrence; it is therefore not infrequently the Nemesis of a life spent in luxurious idleness and self-indulgence. It is probable that the present-day system of education, with all the anxiety produced by endless examination tests, may often be answerable for the earliest beginnings of nerve instability. To the mental training there has also to be added the schoolmaster's craze for athletic development, often carried far beyond the physical strength of the growing boy or girl, and again leading to a depletion of the reserves of energy, which bodes ill for the future capital account of those who, in youth, are compelled to give such hostages to the fortune of their vitality.

In the great majority of cases neurasthenia is a disease of gradual development, but occasionally it sets in acutely and can gradually be referred either to some form of serious mental shock or to an accident which subjects the nervous system to severe physical jarring. Its symptoms are so varied that it is well-nigh impossible to give a comprehensive description of it, but the leading feature of every case is a constant sense of weariedness which prevents the comfortable accomplishment of any act demanding sustained effort. The sense of weakness may declare itself mostly through cerebral or mostly through spinal centers, but there is, as a rule, such an amalgamation of manifestations that it is both superfluous and confusing to follow the descriptive plan of those writers who attempt to differentiate between the one and the other. It is true that in one instance the symptomatological grouping will be mostly cerebral and in another mostly spinal, but no case is ever entirely referable to either the brain or to the spinal cord. Besides, cases are abundant in which the foreground of the pic-

ture is prominently devoted to local manifestations, which may belong to the cardio-vascular, gastro-intestinal, or sexual system almost exclusively.

It mostly happens that the patient, who has been indefinitely out of health for some time, is at last driven to the doctor because of this sense of languor, to which has lately been superadded sleeplessness and impaired digestion. He ascribes all his discomfort to some passing disturbance of that much-abused organ—his liver—and feels confident that once it is put right he will speedily be quite well again. But his friends tell you that within recent times his temperament has entirely changed; that, whereas he used to be cheerful, happy, obliging and sociable, he has become moody, captious, introspective and selfish. He may be emotional, especially when the subject of his present state of health is referred to, and he never wearies of relating the manifold and complex ailments from which he believes himself to be suffering to the few persons he admits to his intimate friendship. From the point of view of physiognomy, two distinctive types of the disease are met with—one, the patients belonging to which are depressed and sullen, and another in which they are excitable and voluble in speech. The former type is thus graphically described by Bouveret: "The patient is pale and thin, without strength or courage, and always sad and dejected. He sees everything from the worst side; he rarely smiles; he goes along with his head down, avoiding the looks of others, his eyes languid and dull; he hardly dares look people in the face when he speaks to them, and the vagueness of his looks is, as it were, a sign of powerlessness, an avowal of the inferiority of his moral strength; he always has the gait of a tired man; he is usually very sensitive to cold, and is clothed in summer almost as in winter; his speech is slow, broken and trailing. This neurasthenic is not talkative."

The latter type is represented by the patient whom Charcot has distinguished by the descriptive title of "the man with slips of paper." He is plump, fresh-complexioned, and capable of a certain amount of activity. His speech is ready, and he enters with avidity into an interminable recital of discomforts and unpleasant sensations which are not harmonious with his general appearance. He is possessed with fears that the full gravity of his condition will not be appreciated, and is so afraid of forgetting the innumerable details of his ailment that, at the outset of his consultation he produces a formidable manuscript statement of his woes and miseries, about every one of which he has endless questions to

ask. This neurasthenic is well known in every consulting-room, and is the terror of the busy physician.

Between these extreme types there is a great variety of intermediate forms, but in every case of neurasthenia the following individual symptoms will be found grouped in every conceivable combination: The tongue is usually frothy, dry and tremulous; it is often also abnormally red. There is no active appetite, but the patient is tempted to eat because of the uncomfortable sense of sinking at his epigastrium, which is temporarily relieved by the taking of food. His bowels are uncertain, being too loose one day and not acting at all the next. He is constantly troubled with flatulent distention of his abdomen, accompanied by frequent eructations which are often disagreeably sour and acrid. The motor power of his stomach may become so seriously impaired that dilatation ensues. He is liable to an uncomfortable form of spasm affecting his colon; and Clifford Allbutt has pointed out that, under such circumstances, it is not uncommon to find in the neighborhood of one of the flexures a soft, sausage-shaped tumor which slips away from under the hand on gentle pressure, and which varies in position from day to day, but is always in the axis of the large intestine. As a rule, the kidneys are over-active; the urine is of low specific gravity and often loaded with phosphates. It is worthy of passing note that in an appreciable number of cases, one or both kidneys are abnormally loose. There is no interference with the functions of the bladder, but micturition may be accompanied by urethral smarting and is occasionally followed by the discharge of a small quantity of prostatic mucus which always cause the patient grave concern and suggests to his alarmist mind sexual horrors of every description.

Headaches are invariably associated with neurasthenia, and the patient is seldom free from them on first waking in the morning. The head sometimes feels as though it were encased in an unyielding iron frame—the "casque neurasthenique" of the French. The pain is usually vertical or occipital in distribution, but it may involve the whole cranium. It is subject to acute exacerbations under the influence of the slightest fatigue or excitement, and it always leaves behind such hyperæsthesia of the scalp that for days it may be almost impossible to brush out the hair. A mild form of vertigo sometimes accompanies the headache, but it is not associated with aural symptoms. The muscles, especially those of expression, are tremulous when put into use, and one or other set of them may become the seat of unpleasant

and uncontrollable clonic spasms. When the tremor affects the whole muscular system, it closely resembles that met with in cases of exophthalmic goitre. Every muscular effort is quickly followed by a distressing sense of weakness, which varies in intensity from day to day, but never goes the length of a true paralysis.

The instability of the vasomotor system is manifested by flushing, sweatings, cold hands and feet, throbbing vessels and palpitation. The knee-jerks are exaggerated, and possess this striking characteristic that when the patellar tendon is tapped in the ordinary way the resulting reflex movement is not confined to the leg, but often extends to the trunk of the body, so that the patient is jerked off his seat by the violence of the reflex act. In a patient under present observation the consequence of tapping the patellar tendon goes even further than this, and invariably brings about an epileptiform attack of a hysteroid character. In marked contrast to this hyper-excitability of the patellar tendon the plantar reflex is either feeble or entirely absent, and the toe phenomenon is always flexor. This reflex antagonism was first called attention to by Buzzard, and is, in a doubtful case, valuable evidence in favor of a functional as opposed to an organic lesion. There may be a spurious ankle-clonus, but it is not maintained beyond two or three movements. The gait is not that of health, nor of any well-known disease of the nervous system; it is neither ataxic nor spastic, but walking is carried on with manifest difficulty, every step being executed at the expense of an enormous effort to clear the feet from the ground, to which they seem to be glued.

Sleep is always disturbed, and is often prevented by spasmodic jerking of the limbs, rushing sounds in the ears, extreme abdominal distention, or a sense of fulness and pulsation in the head. When at last, in the early hours of the morning, the patient drops off, the rest he gets is broken by dreams, often of a terrifying nature, and after a few hours he wakes unrefreshed, and with a sense of inertia, as though he had never closed his eyes.

The special senses are upset in various ways. The visual field may be contracted, there is frequently indistinctness of vision from asthenopia, and mucæ volitantes are a source of constant worry. Buzzing noises in the ears are complained of, and are sometimes accompanied by impairment of hearing. A bitter taste in the mouth may entirely prevent the enjoyment of food, and subjective sensations of smell may haunt the nostrils continually.

Common sensation is impaired either in the direction of hyper-

æsthesia, paræsthesia or anæsthesia. Muscular or neuralgic pains are seldom altogether absent. They are situated, for the most part, in the back, whence they radiate to the legs and arms. Not uncommonly one particular vertebral spine is tender to touch, and is referred to as the center from which all the shooting pains emanate. In women the coccyx is sometimes the seat of acute suffering, and the fifth or sixth intercostal nerve on the left side is, in some unaccountable way, often selected for neuralgic manifestations. The heart is irritable; its action may or may not be persistently rapid, but it is always subject to immediate acceleration on the least physical exertion or mental emotion. The patient is uncomfortably aware of its beatings, but, unless in the presence of anæmia, no murmurs are to be heard at its orifices. Pains in the precordial region and attacks of pseudo-angina are common, and are liable to produce a state of extreme dejection and depression. The pulse is full, compressible and sometimes irregular. Arterial throbbing may be visible to almost as great an extent as in aortic regurgitation; the pulsations of the transverse aortic arch in the suprasternal notch or of the abdominal aorta in the epigastrium may even be so pronounced as to raise a suspicion of aneurysm. Morbid fears possess most neurasthenics. These may assume various phases, but the most constant are a dread of being in an enclosed space—claustrophobia, or its opposite, a dread of crossing an open space—agoraphobia. The former is the more common of the two, and often takes the form of an unreasoning fear of being taken ill in a crowded church or theater from which escape will be impossible.

The general intellectual condition is variable, but its most prominent characteristics are loss of memory and difficulty of mental concentration. A more or less marked degree of amnesia is often the first indication of failing mentation. The patient forgets the names of individuals, and has a difficulty in finding the proper words to describe familiar objects. In writing, he misspells his words and expresses himself badly. The effort of conversation or writing soon becomes, like every other effort he makes, followed by profound exhaustion. With these defects there come to be associated vacillation of purpose, feebleness of volition, and failure of initiative. All interest is lost in the affairs of every-day life, and the patient possesses neither energy nor will force to shake himself free from the concentration of his feeble powers of attention on his own forlorn state, or from the exercise of his faulty and capricious judgment on the means which he

deems necessary for the restoration of his health and energy. He often sees no way out of his miseries but in an appeal to suicide, but, except there be a hereditary tendency to insanity, he seldom puts his oft-proclaimed purpose into execution.

The duration of the disease depends largely upon the circumstances and surroundings of the patient. When the cause is overwork, a suitable holiday will probably speedily bring about recovery. But in many instances a relapse occurs soon after a return to the usual routine of every-day life, and in such, though old age may be attained, there is risk of more or less permanent invalidism. There is, moreover, always a danger that the failure of repeated attempts to effect a recovery may tempt the patient to find relief to his symptoms in an appeal to morphine or chloral for the cure of his insomnia, to cocaine or some other of the numerous analgesic drugs for the mitigation of his pain, or to alcohol for an escape from his overmastering depression and languor. If an illegitimate indulgence in any of these is permitted, either by the well-meant but injudicious advice of friends, or by the weak-kneed indifference of the doctor, or by the yielding of the patient himself to the temptation they constantly set before him, the possibility of his becoming a hopeless slave to narcotics or stimulants, or both, is a serious contingency which must ever be kept steadfastly before the prognostic eye.

There is one variety of the disorder which, at least in its earlier developments, comes rather within the domain of surgery than medicine, to which short reference must be made in order to make the picture complete. It bears all the stigmata of ordinary neurasthenia, but it possesses this important characteristic that it is initiated by an injury or shock, and can therefore be referred to a definite cause. A railway or other accident which causes grave concussion of the cerebro-spinal system is the most frequent form of antecedent injury, and though in many instances the evidences of nervous breakdown ensue immediately after, it is remarkable that more commonly an interval, varying from a day to several weeks, in which the patient is apparently perfectly well, intervenes between the occurrence of the accident and the first manifestation of nervous symptoms. The patient may at first be dazed and stupid, but without complete oblivion as to what has taken place, or he may be restless and hysterical.

He then either immediately glides into neurasthenia or rapidly regains his normal composure for the time being, but subsequently develops the usual signs of nervous prostration and instability.

These are in all respects similar to the symptoms of the idiopathic affection, but general paresis is often more marked, and localized monoplegias, mostly affecting the lower limbs, are not unusual. Hysterio-epilepsy is said to be a frequent sequel in traumatic cases, but though not unknown elsewhere, it is comparatively rare outside of France.

The sequential dangers to be feared after neurasthenia are mostly referable to the nervous system. Hysteria in women and hypochondriasis in men are the most frequent complications, and, when there is an inherited tendency to mental disease, the neurasthenic attack may prove to be the first step downward in the direction of insanity. A concussion or jar severe enough to produce neurasthenia, but unaccompanied by apparent tissue lesion, has frequently proved the starting point of various forms of cerebral and spinal sclerosis.

Exophthalmic goitre sometimes supervenes on neurasthenia, and interesting speculations as to the closeness of the relationship between these two disorders are, as has already been mentioned, suggested by the similarity of many of the symptoms common to both of them.

As regards prognosis, the majority of cases ultimately recover, and even when complete restoration of health is not achieved, life itself is rarely threatened. Inveterate cases may go on from bad to worse until the patient's career is ultimately terminated by an incurable melancholia or dementia, but even after the continuance of complete disability over a period of years, a striking event in the patient's life, such as a sudden and unexpected accession of fortune, may speedily dissipate the symptoms from which he has so long suffered, and he may recover the full usefulness of a vigorous and active existence. Unfortunately, even after recovery has taken place, relapses are so liable to follow that the possibility of permanent cure must always be stated in terms of guarded circumspection. The outlook is most favorable when the patient is in comfortable worldly circumstances, and is thus enabled to secure the rest, change of scene, and other appropriate addenda of treatment without attendant worry as to ways and means.

In well-marked cases there is seldom any difficulty in diagnosis, but it is important to bear in mind the possibility of the co-existence of organic disease. Neurasthenia merges almost imperceptibly into other morbid groups, and it is impossible to draw a definite boundary line between it and such closely allied conditions as hysteria or hypochondriasis. Examination of the urine and of

the fundus oculi should never be omitted so as to minimize the danger of overlooking structural diseases of the nervous system or of the kidneys, in many of which the early stages present symptoms of a distinctly neurasthenic type.

The resemblance to Graves' disease is so great that certain diagnosis may, for a time, be impossible, but a persistent pulse of 120 or more, accompanied by vaso-motor disturbances, is distinctly in favor of early exophthalmic goitre, whereas the existence of morbid fears, especially of claustrophobia or agoraphobia, is an equally strong argument in favor of neurasthenia. The neurasthenic is not emotional to the like degree as the hysteric, nor does he crave in the same way for sympathy. In traumatic cases it is always necessary to guard against the possibility of malingering or deliberate simulation, especially when questions of compensation are in the balance.

As regards treatment, rest is the first and obvious indication, and it must always be both mental and physical. Its power for good is intensified by the moral effect exercised on the patient by his physician and his surroundings. His enfeebled will-power is keenly susceptible to the influence of his environment, and in the seclusion of a nursing home the medical attendant has great opportunities for diverting his patient's mind from its usual gloomy and introspective imaginings by judicious management and by recourse to the various hygienic and therapeutic measures which are calculated to restore his energies and lost courage. In mild cases the requisite amount of variety and rest may be got from a sea voyage, a trip abroad, or a change of scene and surroundings at home; but no routine method is universally applicable, and it often happens that the breakdown has gone too far to leave sufficient energy for the enjoyment of either travel or recreation. Under such circumstances a course of Weir-Mitchell treatment will yield the best results. The essentials of this method are continuous rest, enforced feeding, and massage, and those require to be maintained over a period of six or eight weeks if a permanent benefit is to be achieved. Electricity is often of signal service as an addition to the other details of a rest cure. Its success is perhaps mostly due to its suggestive influence on the patient's mind, but it also undoubtedly promotes metabolism, stimulates muscular activity, and exerts a soothing and pleasant influence on the nervous system. When the rest cure is finished, the improvement gained will be made more lasting if the patient pays a short visit to the country, seaside, or a suitable spa before re-entering the field of his daily labor. Though drugs play a secondary part,

they ought not to be wholly neglected. When there is much restlessness, and particularly when sleep at night is broken, the bromides in suitable doses will be found of advantage. It is often a successful plan to order one or other of them in combination with arsenic or strychnine during the day, and, should insomnia still persist, to provide for it separately by 20 gr. of sulphonal, trional, or chloralamide, or 5 gr. of chloralose at bedtime. As soon as the sleep habit has been re-established the hypnotic should be dropped, and on disappearance of the restlessness the bromides also may be withdrawn. When the simple hypnotics fail to induce refreshing sleep the question of the eligibility of narcotics arises. Much has been written against the use of morphine, on account of the risk of creating an unconquerable habit, but if care is taken not to extend its employment beyond the immediate necessities of the case, it will be found that a few small doses, given hypodermically on successive nights, will have the desired effect without the least subsequent risk of habitual dependence on its influence. If anæmia is present iron in one of its milder preparations should be administered; and when vasomotor instability is a prominent symptom, there is no drug which exerts a better steadying influence on the circulation than ichthyol. It may be given in doses of from 5 gr. to 10 gr., and is often usefully combined with cannabis indica and one or other of the nerve tonics. A combination of 5 gr. of ichthyol, 5 gr. of reduced iron, 1-40 gr. of arsenious acid, and 1-3 gr. of extract of cannabis indica will be found to meet successfully the requirements of a large proportion of cases. As soon as the digestion is strong enough to deal with it, codliver oil should be added to the daily regimen. It is best given in one dose of half an ounce at bedtime, and it may be advantageously combined with a like quantity of maltine.

The bowels must be carefully regulated by a simple aperient, if such be required, and the activity of the liver will be promoted by an occasional dose of calomel or blue pill. When there is much discomfort from flatulence valerian fulfils a useful rôle; its nauseous taste may best be obviated by choosing the zinc salt and giving it in the form of a pill or capsule. If headaches are severe and persistent they will be relieved by the exhibition of one of the numerous analgesics so much in vogue nowadays. The most dependable is probably antifebrin, which should be ordered in doses of not less than 5 gr. Alcohol must always be used sparingly, if at all. A tumblerful of well-matured stout taken with luncheon is often enjoyed, but in many cases a light Burgundy or claret is preferred, and agrees better. In traumatic cases, if there is much

complaint of spinal tenderness, the use of a Paquelin cautery often affords marked relief to the pain.

Measures of prophylaxis ought not to be neglected. Children born of neuropathic parents should be safeguarded from the risk of their heredity by strengthening, as far as possible, the energy and resistance of their nervous centers. This can best be done by employing every hygienic means, during their development period, to ensure such a physical and moral education as shall substitute an acquired stable individual habit for an inborn unstable tendency without risk of over-pressure. An adult who has once suffered from neurasthenia may do much to lessen the risk of recurrent attacks by careful regulation of his daily habits of life.

He must arrange his work so as to avoid undue fatigue. He should have long nights in bed, observe regularity in regard to his meals and exercise, and make a point of seeking periodically short respite from the daily routine of duty by a change of scene and surroundings. He ought to decline all responsibilities involving prolonged worry or anxiety, and every slight ailment should be treated with more than ordinary care, so as to lessen the risk of strain on his nervous system.—From "The Medical Examiner and Practitioner," March, 1904.

PREPARING CLAMS FOR FOOD PURPOSES.—In the coast districts of many countries clams are used as an article of food to a large degree, especially by the poorer classes. It has now been shown that these common clams, as is also the case with the finest oysters, are occasionally infested with typhus bacilli, and are therefore very dangerous. If they are cooked at all, it is in most cases done so superficially that the bacteria are not killed thereby. The method, especially, of placing the nets containing clams for a short time in hot water is not sufficient. Doctor Klein, the bacteriologist, has demonstrated that this nutritious food can be entirely freed from deleterious additions by cooking it for a longer time. Clams should always be boiled in steam. If three layers of them are cooked by steam at the same time, ten minutes are sufficient for the lower layer and fifteen for the two others. Bacteriological investigation has demonstrated that after steaming clams for the length of time mentioned, no living bacteria, introduced into them before, were found. Steaming clams is far superior to boiling them in water.—Richard Guenther, Consul-General, Frankfort, Germany, January 26, 1904.

POISONING OF ENGLISH BEER AND FOOD.

(From United States Consul Smyth, Tunstall, England—Consular Reports for May.)

We are just now having an echo in the courts of the epidemic of poisoning which broke out in Lancashire and Yorkshire four years ago, and which was subsequently traced to arsenical contamination of beer. Many deaths occurred at the time and so great was the sensation produced that the government was forced to step in and appoint a commission of experts with instructions and full powers to tap every source of information available with a view of locating the responsibility. This was done in the most thorough manner, as the report issued in the form of "blue books" unmistakably shows.

The head of this commission was Lord Kelvin, well known in the scientific world on both sides of the Atlantic, and associated with him were some of the cleverest analysts and toxicologists in the country.

In the present case judgment has been entered against the defendants, but the question of damages is still in abeyance.

SULPHURIC ACID FROM PYRITES.

Messrs. Bostock & Co., plaintiffs, were manufacturers of glucose, or "invert" sugar, at Liverpool and had a large trade with brewers in Lancashire and Yorkshire for that product. Messrs. John Nicholson & Sons, of Hunslet, Leeds, defendants, had a contract to supply the plaintiffs with sulphuric acid to be used in the preparation of brewing sugar.

The analytical tests showed that this acid was impure, inasmuch as it contained arsenic in such quantities that the wort was poisoned and the ultimate brew rendered unfit and unsafe for human consumption. When this fact became known, Messrs. Bostock & Co. lost their trade and were eventually forced into liquidation. They sued for £300,000 ($1,460,000) damages for violation of contract, alleging that the defendants supplied them with an impure acid made from pyrites, when the conditions of their contract required them to provide a pure, commercial acid made from brimstone. The defendants denied any knowledge of the fact that the plaintiffs were using this acid in the preparation of glucose for brewing purposes, and stated that in this country pyrites had for nearly thirty years superseded the use of brimstone in the manufacture of sulphuric acid.

Pyrites, I may add, are imported chiefly from Spain and Portugal.

The progress of the case was watched with great interest, particularly by the brewers. The evidence of the public analyst for Liverpool was one of the sensational features of the trial. He declared that there was a sufficient quantity of arsenic in the acid supplied to Messrs Bostock & Co. to kill a million people a week. This showed that the discovery was made none too soon. Had the analysts failed to come to the aid of the physicians in determining their diagnoses, the consequences to beer consumers in the districts named would have been very little short of appalling.

ADULTERATION OF ENGLISH FOOD PRODUCTS.

All the circumstances connected with this case are focused on the vital question of food and drink adulteration, as indicating the remarkable changes that have taken place in this country within the last quarter of a century. In confirmation of this, it is only necessary to refer to the efforts of the government to check the evil by legislation and by a system of espionage on the part of inspectors and experts that has been attended by very poor results so far. English ale—commonly called beer—was from time immemorial associated in people's minds with the highest standards of purity in fermented drink; but its purity has been questioned, and the effects of this questioning are not likely to fade away as long as the present generation remains.

When the real cause of the epidemic became known the beer drinkers in many districts were seized with panic and adopted whisky or gin as a substitute; brewing stocks fell, and both producer and consumer had to suffer from the general excitement and alarm.

ARSENIATED GLUCOSE AND SULPHURIC ACID.

The quantity of arsenic, as arsenious oxide, discovered in samples of Bostock glucose taken from the breweries varied to a great extent, and in many cases was very large. The analysis of Professor Delepine, of Owens College, Manchester, showed 1.05 to 6.6 grains per pound; that by Mr. E. W. T. Jones, public analyst of Staffordshire (1 sample), 1.6 grains per pound; while Professor Campbell Brown, University College, Liverpool, examined a sample that contained a percentage equal to 9.17 grains per pound. Samples of "invert" sugar manufactured by the same firm and taken from the breweries showed quantities of arsenic in relatively large proportions, some of these as high as 4.34 grains per pound. The examination of the sulphuric acid used in the manufacture of

these sugars—that is to say, glucose or "invert"—showed an exceptionally high percentage of arsenious oxide, the quantity present in some samples running as high as 2.06 per cent. This acid was made from pyrites and was supplied by Messrs. Nicholson & Sons to Messrs. Bostock & Co. from February until November in one year.

ANALYTICAL TESTS OF BEER SAMPLES.

The analysis of some samples of beer brewed from these sugars brought out startling revelations. The quantity of arsenic ran as high as 1.5 grains per gallon, while in one case it reached 3 grains per gallon. Under such circumstances there is no room left to wonder at the spread of an epidemic among the masses of the two greatest industrial districts in England, when its causes and its pathology have been so clearly and firmly established. While no accurate estimate of the number of people affected could be ascertained, it is generally presumed that 10,000 would be nearly correct.

Before the pathology of the epidemic had been thoroughly understood hundreds of cases were treated as "chronic alcoholism," "cirrhosis of the liver," and various aggravated types of neuritis. It was about this time that a local practitioner brought the attention of the medical profession to a morbid condition found in many Manchester beer drinkers known as the "alcoholic heart."

CONTAMINATED TABLE SIRUPS.

Shortly after the discovery of arsenic in the brewing sugar of Messrs. Bostock & Co. the government inspectors found that the firm was about to place upon the market a new product in the form of a "table sirup," made from sugar "inverted" by Nicholson's sulphuric acid. This sirup was put up in two-pound tins, a large quantity of which had been sent to retail traders as trial samples. As good luck would have it, the sirup became solidified in the tins, through some accident in the process of manufacture, and all were returned. The analysis of Doctor McGowan, one of the experts to the commission, showed 1 grain of arsenic to each pound of this sirup. The whole stock, amounting to 14 tons, was thereupon destroyed.

ARSENICAL CONTAMINATION OF MALT.

In several instances it was found that beer manufactured by brewers using glucose, or "invert," other than Bostock's, contained arsenic. This led to closer examination on the part of the experts, which resulted in tracing the contamination to the malt kiln where gas coke was used as fuel. The economy of the latter as a substitute for oven coke, or "picked" anthracite, led to its use

by maltsters in the remote districts of Yorkshire and other counties. The arsenic in the fumes of the gas coke was brought into direct contact with the malt, deposited on the grain, and subsequently conveyed to the fermenting tub. The method of treating malt in these kilns was primitive and careless; in the brushing or cleansing process, which is an important feature of malt preparation, this is especially true. In defense of these methods, it was argued that malt treated in this manner derives a certain flavor, which is imparted to the beer and is very much appreciated by consumers. Admitting this, and ruling out the use of gas coke, a suggestion was made that the fumes of the fire might be advantageously passed through a screen of lime at the exit, so that the arsenic passed off in combustion might be taken up and the malt thus protected against contamination. A number of experiments in this direction are now in progress where the reconstruction of the kilns becomes a matter of impossibility from an economic point of view. All the leading brewers in this country now manufacture their own malt.

ADULTERATION OF FOOD PRODUCTS.

Incidentally, the attention of the commissioners was directed to the subject of arsenical contamination of certain food products and its effect upon the public health. The dangers from this source through preservatives, mineral coloring matters, etc., are pointed out and the people are admonished to be on their guard against them. Coal-tar products, caramel, phosphoric acid and phosphates, boric acid and borates, yeast foods, tartaric and citric acids, iron oxides, and glycerin are specially scheduled under this head. There is probably no country in the world so much exposed to the pernicious consequences of food adulteration as England is to-day. This is the result of sweeping changes in the agricultural, economic, and social conditions which have taken place concurrently with the steady increase in population and the enormous demand for food supplies from outside sources. Nearly every quarter of the globe contributes its quota, while the science and resources of chemistry are being constantly ransacked to supply us with some new and subtle product as a substitute for food, or the real thing itself, patented by the law and promulgated by the press through advertisements. We have reached that stage when it is well-nigh impossible, when we sit down to a meal, to tell where our food comes from or what it contains; we take some of it, as we do medicine, and wait for results. London gets the best of everything; the poor provincial has to take what is left—the adulterated residue;

the jams, marmalades, sirups, confectionery, etc., contain glucose or cheap sugars, "inverted" or otherwise, which have their proportions of arsenic. The milk is either sterilized by air or neutralized by water, while the potted creams, which are now the fashion, are preserved like the sweets and fall into the same category. Even vinegar has not escaped, for here again the sulphuric acid figures in the "conversion" of the grain.

SUGAR AND SAUSAGE.

Demerara sugar, that innocent product of the colonies, has been found in an arseniated state from the practice of using phosphoric acid or chloride of tin to give it a "bloom," and sausage-makers have fallen into the habit of coloring their links with iron oxides that are particularly obnoxious to living tissues.

ENGLISH COFFEE.

Coffee is made up largely of chicory, which comes from Belgium, where the roots are dried in kilns heated by coke, and, like malt, exposed to the toxic products of combustion. I will venture to say that every American who has traveled in England will bear me out in the statement that a cup of pure coffee is absolutely unobtainable in ninety-nine out of every one hundred hotels in the country. Either as a food product or a stimulant, chicory is admitted to be inferior to coffee; yet the mixture is everywhere permitted and even sanctioned by law. An abominable compound of this nature is sold in the shops, while, in accordance with the requirements of an act of Parliament relating to the adulteration of food, the printed paper on the tin tells you what it is.

AMERICAN FOOD PRODUCTS ABROAD.

As far as American food products are concerned, I am happy to be able to state that the cry that was raised against them a few years ago has entirely subsided and their position in the market is now stronger than ever. In the case of American glucose, which is largely imported into England, not a single objection was raised by Lord Kelvin's commission. It stood the tests of the analysts in every instance where its purity was brought into question, while samples of the German article were found to contain slight traces of arsenic. I attribute our position in the food market, both here and elsewhere, to the free hand given to our agricultural department and the system of inspections which the latter has adopted and is carrying out with great success.

WM. P. SMYTH, *Consul.*

TUNSTALL, ENGLAND, February 20, 1904.

EDITOR'S TABLE.

SANITARIAN, JUNE, 1904.

BURIED ALIVE—THE CORONER'S OFFICE.

Exulting in the apparently good riddance, the Governor having signed the bill abolishing the coroner's office, THE SANITARIAN and the medical profession of the city generally, all too soon, a month ago wrote obituaries of the office. Being a city bill, however, it required submission to the Mayor and his approval before it could become a law. Wholly regardless of the obituaries the Mayor has since sat upon it—*a la* "crowner's quest." The still would-be coroners adduced testimony to their good office in contrast with the contradictory opinions expressed concerning the proposed new measure, insomuch that the Mayor disapproved the bill, and it is buried—the coroner's office still lives.

MORTALITY AND MORBIDITY REPORTS AND REVIEWS.

SIR HENRY THOMPSON, Bart, the distinguished surgeon and sanitarian, died at his home in London, April 18, 1904.

Sir Henry Thompson was surgeon extraordinary to the King of the Belgians, consulting surgeon to the University College Hospital, London, and Emeritus Professor of Clinical Surgeons. But he was more distinguished as sanitarian than surgeon, particularly with regard to "Diet in Relation to Age and Activity"—the subject of a treatise by him first published in 1886. Revised and enlarged (Frederick Warne & Co., London and New York) 1902. The earlier edition seemed to encourage the propagandists of vegetarianism, in so much that they claimed him as a disciple. The

later edition, however, is explicit in this regard; exposes the fallacies of the vegetarians, so called, advocates mixed diet, points out the errors and excesses in diet as the fruitful sources of disease and short life.

Sir Henry was born in Framingham, Suffolk, August 6, 1820. He was graduated in medicine at the University College, London, where he won honors. He was created a baronet in 1899. He was also the author of numerous papers on scientific and surgical subjects which are generally accepted as authoritative, and wrote two novels, "Charley Kingston's Aunt" and "All But." He was known also as a painter of ability and a deep student of astronomy.

STATE OF NEW YORK.—Monthly Bulletin, Department of Health, for March, 1904, 7,738,000: Total number of deaths, 14,308; annual death rate, 21.7; deaths under 1 year, 2,116; deaths 1 to 5 years, 1,123; deaths at 70 years and over, 2,828; deaths from cerebrospinal meningitis, 105; typhoid fever, 163; malarial diseases, 10; smallpox, 1; scarlet fever, 52; measles, 168; erysipelas, 73; whooping-cough, 50; croup and diphtheria, 252; diarrheal diseases, 182; consumption, 1,432; pneumonia, 2,011; acute respiratory diseases other than pneumonia, 1,072; puerperal diseases, 144; diseases of the digestive system (not acute diarrhea), 757; diseases of the urinary system, 1,040; diseases of the circulatory system, 1,458; diseases of the nervous system, 1,449; cancer, 492; accidents and violence, 619; old age, 660; general diseases not epidemic (except consumption and cancer), 572; unclassified, 1,442.

The largest number of deaths ever recorded in one month in this State. In twenty years covered by our records there have been fourteen months only in which the reported number of deaths has exceeded 12,000, and four times only has the monthly mortality reached 13,000; these were in January, 1890 and 1892; April, 1891, and July, 1892. July is uniformly the month in which the greatest number of deaths occur, and ordinarily there are between 11,000 and 12,000 deaths in July every year. But it is noteworthy that the periods of phenomenal mortality, when the number of deaths rises far above the ordinary for the month, occur in the winter or spring months. These extraordinary increases are mainly due to deaths from acute pulmonary diseases, which cause a far larger element of variability in mortality than do the diarrheal

diseases of midsummer. In the years 1890 to 1893, in which the great monthly mortalities occurred in the winter and spring months, the deaths from acute respiratory diseases for the year rose from less than 14,000 of preceding years to between 18,000 and 20,000 deaths for the year, mortalities which have hardly ever since been reached. No other causes or groups of causes of death have shown anything like this variation.

New York City, 3,838,024.—Total number of deaths, March, 7,684—annual death rate 23.6: Borough of Manhattan, 1,940,121; deaths, 4,413—death rate, 26.0. Borough of the Bronx, 294,939; deaths, 530—21.2. Borough of Brooklyn, 1,334,952; deaths, 2,345—20.6. Borough of Queens, 193,494; deaths, 257—16.6. Borough of Richmond, 74,518; deaths, 139—22.2.

INFECTIOUS DISEASES AND DEATHS FOR

	Week ended April 30.		Week ended May 7.	
	Cases.	Deaths.	Cases.	Deaths.
Measles	1,398	46	1,836	39
Diphtheria and croup	409	62	382	40
Scarlet fever	419	26	391	23
Smallpox	6	...	1	...
Chickenpox	44	...	78	...
Tuberculosis	490	199	411	197
Typhoid fever	40	6	18	8
Cerebrospinal meningitis.	30	70	...	77
Totals	2,756	409	3,117	384

COLORADO.—Denver, 175,000. Report for February: Deaths, 305—42 under 5 years; premature and still births, 10; death rate, per annum, 20.89. Deaths from phthisis, 68—"61 contracted elsewhere"; typhoid fever, 3 cases, 3 deaths; smallpox, 20 cases; chickenpox, 1 case; diphtheria, 32 cases, 2 deaths; scarlet fever, 50 cases, 3 deaths; measles, 180 cases, 4 deaths; erysipelas, 18 cases, 2 deaths; deaths from heart diseases, 10; pneumonia, 66; broncho-pneumonia, 5; nephritis, 11; cancer, 9.

CONNECTICUT.—Bulletin for March: Deaths, 1,517—130 more than in February and 96 more than in March of last year, and 115 more than the average number of deaths in March for the five years preceding.

	1904.	1903.	1902.	1901.	1900.	1899.
January	1,439	1,420	1,172	1,439	1,367	1,565
February	1,387	1,303	1,124	1,381	1,261	1,192
March	1,517	1,421	1,239	1,441	1,691	1,221
Total 1st quarter	4,343	4,144	3,535	4,261	4,319	3,978

The death-rate was 19.3 for the large towns, for the small towns 19.1, and for the whole State 19.2.

The deaths reported from infectious diseases, including diarrheal, were 353, being 23.2 per cent. of the total mortality.

Cases of infectious diseases reported: Measles, 844 in 57 towns; scarlet fever, 191 in 47 towns; diphtheria and croup, 93 in 26 towns; whooping-cough, 55 in 8 towns; typhoid fever, 31 in 17 towns; consumption, 29 in 11 towns.

Annual Report, 1903: The mortality was larger than in the previous year. Partly ascribed to increase of population, but chiefly to greater prevalence of infectious diseases.

For the twelve months ended August 31, 1902: Total deaths in the State, 14,248; for the corresponding period, 1903, 15,338. Tabular statistics and diagrams show the relative prevalence of the infectious diseases and ratios of mortality severally, for the two periods. From tuberculosis, however, there is a continued reduction, proportional with the increase of preventive measures; percentage of deaths to total mortality, 9.34. The admirably situated sanatorium for the treatment of tuberculosis, in New Haven County, now approaching completion, is described with illustrations.

The reports of the county health officers throughout the State are eminently creditable to the service.

The death rate of the total registered mortality of the year, exclusive of still births, was 15.2 per 1,000 of living population—940,785. The greatest mortality was in July; the smallest in June.

DISTRICT OF COLUMBIA, 300,902—91,603 colored. Report for the week ended May 7: Deaths, 117, as against 104 during the previous week and 102 during the corresponding period of 1903. Of the deaths last week 70 were among the white inhabitants and 47 among the colored, which represent a death rate of 17.4 and 26.7, respectively; 20.2 as compared with 18.7 for the corresponding period of last year, and 17.9 for the previous week. The prevailing diseases responsible for the mortality of last week were

pulmonary consumption, 20; diseases of the kidneys, 10; diseases of the heart, 9; pneumonia, 11; cancer, 5, and apoplexy, 4. There were 3 suicides and 1 homicide. There was no change in the number of cases of diphtheria, there having been 4 new cases reported and 4 discharges, leaving as per last report 9 cases under treatment, quarantined in 7 different premises. Cases of scarlet fever increased by 1, making 27 cases in all under quarantine in 17 different premises. Eight new cases developed and 7 were discharged, including 2 by death. Typhoid fever shows a small increase of cases over those of last week—viz., 6 new cases, 2 discharged, leaving 49 cases in all under treatment.

ILLINOIS, Chicago.—Statement of mortality for the month of April, 1904, compared with the preceding month and with the corresponding month of 1903:

	April, 1904.	March, 1904.	April, 1903.
Total deaths, all causes	2,486	2,609	2,628
Annual death rate per 1,000	15.68	15.93	17.06
By sexes—			
Males	1,431	1,564	1,527
Females	1,055	1,045	1,101
By ages—			
Under 1 year	387	430	435
Between 1 and 5 years	156	176	333
Over 60 years	563	573	505
Important causes of death—			
Acute intestinal diseases	100	96	99
Apoplexy	70	79	54
Bright's disease	193	157	147
Bronchitis	100	93	131
Consumption	296	332	283
Cancer	91	97	82
Convulsions	53	61	67
Diphtheria	27	31	47
Heart diseases	207	181	169
Influenza	13	18	20
Measles	4	2	70
Nervous diseases	102	112	141
Pneumonia	517	621	604
Scarlet fever	24	18	32
Smallpox	1	0	9

Suicide	32	38	38
Typhoid fever	35	34	33
Violence (other than suicide)	122	114	101
Whooping-cough	3	3	40

With but three exceptions the April, 1904, death rate is among the lowest on record. In 1897 the rate was 13.84 per 1,000 of the population; in 1901 it was 14.64 and in 1902 it was 15.83. For the previous ten years the average annual rate had been 17.31.

The 2,486 deaths reported during the month up to the close of office hours April 30 represent an annual rate of 15.68 per 1,000—or 9.4 per cent. lower than the average.

Mayor Harrison's Review, from his Annual Message, April, 1904, says: I have kept in closer touch with the Health Department than usual during the year, and as a result I wish to bring somewhat fully to the attention of the Council the present status of this branch of my administration, the results of its work and its effect upon the reputation of the city.

It must be a source of gratification to learn that, while Chicago spends the least amount, per capita, for health purposes, it has the lowest death rate of any of the principal cities of the country. These two assertions are based on official reports of the United States Census Office and the United States Department of Labor.

These figures show Chicago's death rate to be 20 per cent. lower than the average of the other ten cities, 23 per cent. lower than Baltimore's, 24 per cent. lower than Philadelphia's, 32 per cent. lower than Boston's, and 36 per cent. lower than New York's. They show its per capita expenditure for health purposes to be 58 per cent. lower than the average, and 66.6 per cent. lower than that of Boston and New York.

In achieving these results the following features of Health Department work are regarded as important factors:

1. Supervision and inspection of the milk supply, which has resulted in giving Chicago the best milk and cream of any large city in the country. The improvement in its quality and consequent effects on child life are shown in the statement that in 1896 more than one-third (37 per cent.) of the samples examined in the Municipal Laboratory were found to be below grade, and the deaths of children under 5 years of age were 66.6 per 10,000 of total population. In 1903 only 6.4 per cent. were found below grade, and the children's deaths were 44.7 per 10,000—an improvement of 83 per cent. in milk quality and a decrease of 33 per cent. in child mortality.

I would call the attention of the Council to the fact that the present force available for supervision of the milk supply—which includes the collection of samples throughout the entire city, inspection of dairies, stores where milk is sold, wagons, utensils, etc., consists of six milk inspectors, one dairy inspector and one milk tester. The total cost of this service for the year 1903, including salaries, horse feed, shoeing, repairing of harness and vehicles, purchases of appliances, bottles, chemicals, apparatus, etc., was $8,915. The license fees paid into the City Treasury amounted to $45,647. Add to this the sum of $7,217, collected in fines from violators of the Milk Ordinance, and the total receipts by the city through the work of the Milk Division amount to $52,864, or $43-949 more than its total cost. I beg to suggest to your Honorable Body that some part, if not every dollar, of this excess of receipts over expenditures would be profitably employed in the extension of the services of the Milk Division to the work of careful inspection and supervision of Chicago's milk supply at the points of production.

2. The efforts of the Department in the field of preventive medicine, especially with reference to consumption, diphtheria, influenza, pneumonia, scarlet fever, smallpox and typhoid fever. In 1893 the consumption death rate was 18.10 per 10,000 of population. A campaign of education in the cause and restriction of the disease was then begun, and has been carried on since. Last year the death rate was 14.04—a decrease of more than one-fifth (22.4 per cent).

In 1894 the city paid the penalty of previous years of neglected vaccination through an epidemic of smallpox, which cost 1,190 lives and an enormous loss in money. The practice of vaccination has been completely modernized and persistently pushed. An up-to-date Isolation Hospital has replaced the old "pesthouse," and at the close of last year there had been but sixty-one deaths from smallpox since 1895.

In October, 1895, the Department promoted the antitoxin treatment of diphtheria and assumed its treatment among the poor and destitute. In that year the deaths from this disease amounted to 11.66 per 10,000 of population. Last year they were only 3.44 per 10,000—a decrease of 70 per cent.

During the three years previous to the first appointment of the present Commissioner there were 4,494 deaths from typhoid fever—an average annual rate of 12.86 per 10,000 of population. During the last three years, 1901-1903, there were only 1,898 such

deaths—an average annual rate of 3.46 per 10,000 and a decrease of nearly three-fourths (73.1 per cent.) in the typhoid mortality. The decrease is due, in large measure, to the information given to the public as to the sanitary quality of the water supply, based upon the daily chemical examinations.

3. Chicago's system of free public baths, open throughout the year, is also a factor of public health. More than half a million men, women and children were, during the past year, afforded bathing facilities without charge. The Carter H. Harrison bath, opened in January, 1894, was the first absolutely free municipal bath established in the world.

Among other features of the ten years' work of the Department may be mentioned the development of a first-class practical working laboratory of chemistry, bacteriology, pathology and diagnosis, whose scope and volume of work may be inferred from the fact that considerably more than 100,000 separate determinations and manipulations are made annually in the regular branches, exclusive of special examinations and analyses;

—the original devising and subsequent perfecting of a system of disinfection, already widely copied elsewhere;

—the inauguration of medical school inspection in 1896—the second city in the country to make the attempt;

—the vast improvement in the registration of vital statistics and the certification of causes of death;

—the supervision of contagious diseases during life, and the conduct of their funerals and care of premises after death;

—and, above all, the persistent education of the public by circulars, leaflets, bulletins, lectures and addresses, whose lessons and precepts are disseminated and emphasized by various civic and philanthropic organizations, and still more widely by the public press.

The Commissioner claims that the Chicago public is thus made more intelligent on sanitary matters than is any other community, and largely to this fact he ascribes the constantly increasing healthfulness, the reducing death rates and the lengthening of human life in Chicago—facts shown by the Department's figures and corroborated by the official statistics of the United States authorities.

INDIANA.—The monthly bulletin of the Indiana State Board of Health says: There was an improvement in the health of the State in April as compared with March, but not in comparison with the

same month last year. For three consecutive months measles has been the most prevalent disease. Pneumonia, which was second in prevalence in March, was fourth in April. The order of prevalence was—measles, rheumatism, bronchitis, pneumonia, tonsillitis, influenza, typhoid fever and diarrhœa. Typhoid was more prevalent than usual, the deaths being more than in the same month in the three preceding years.

DEATHS.—The total deaths numbered 3,322, rate 15.2. In the preceding month the rate was 18.1 and in the corresponding month last year 12.7. The increase over April of last year lies almost entirely in the increase in typhoid, influenza and pneumonia. Deaths under 1 year, 532—16.9 per cent. of total; 1 to 5 years, 250. Deaths from tuberculosis, 385; typhoid, 56; diphtheria, 30; scarlet fever, 21; measles, 40; whooping-cough, 14; pneumonia, 557; influenza, 72; cancer, 89; violence, 134.

SMALLPOX.—There were reported 260 cases, in 29 counties, with 6 deaths. In the same month last year 590 cases, in 56 counties, and 21 deaths.

IOWA.—State Board of Health Bulletin for April reports outbreaks of infectious diseases in March: Typhoid fever in Vinton; chickenpox, Des Moines; measles in 5 localities; diphtheria in 5 localities; smallpox in 10 localities; scarlet fever in 24 localities. In February: Chickenpox, Spirit Lake; measles in 11 localities; diphtheria in 13 localities; scarlet fever in 31 localities; smallpox in 12 localities.

LOUISIANA.—New Orleans, 317,000—84,000 colored. Report for April, 1904: Total deaths, 387 white; 236 colored: 623 deaths under 1 year—white, 106; colored, 51; 1 to 5 years—white, 34; colored, 26. Death rates: white, 29.93; colored, 33.71; 23.58. Deaths from typhoid fever, 4 white, 2 colored; pneumonia, 23 white, 31 colored; tuberculosis of the lungs, 42 white, 41 colored; Bright's disease, 29 white, 8 colored; cancer, 13 white, 5 colored; senile debility, 16 white, 1 colored.

MICHIGAN.—The Secretary of the State Board of Health reports for April, 1904, compared with the preceding month, measles, smallpox, intermittent fever, inflammation of bowels, remittent fever, dysentery and cholera infantum were more prevalent; and influenza, pneumonia, pleuritis, cancer, erysipelas, diph-

theria, inflammation of brain, whooping-cough, meningitis, membranous croup and puerperal fever were less prevalent.

Compared with the average for April in the 10 years, 1894-1903, smallpox, typhoid fever and diphtheria were more than usually prevalent; and influenza, pneumonia, pleuritis, intermittent fever, erysipelas, remittent fever, cholera morbus, inflammation of brain, whooping-cough, meningitis, membranous croup and puerperal fever were less than usually prevalent. Meningitis was reported present at 9 places; whooping-cough at 20 places; diphtheria at 61 places; typhoid fever at 76 places; pneumonia at 115 places; scarlet fever at 128 places; smallpox at 151 places; measles at 171 places; and consumption at 260 places.

The total number of deaths returned to the State Department for the month of April was 3,212, or 194 less than the number registered for the preceding month. The death rate was 15.7, as compared with a rate of 16.0 for March. Deaths under 1 year, 518; 1 to 4 years, 172; 65 years and over, 1,008.

Deaths by causes: Tuberculosis of lungs, 235; other forms of tuberculosis, 37; typhoid fever, 81; diphtheria and croup, 47; scarlet fever, 25; measles, 27; whooping-cough, 15; pneumonia, 302; influenza, 104; cancer, 145; accidents and violence, 184.

There was a marked rise in the number of deaths from typhoid fever, and a decrease in the number reported from pneumonia and influenza, as compared with the preceding month.

MINNESOTA.—Minneapolis, 240,000. Report for March: Deaths, 231—44 under 5 years. Annual death rate, 10.68. Deaths from typhoid fever, 29; consumption, 23; cancer, 7; organic heart disease, 12; other diseases of the circulatory system, 3; bronchitis, 7; pneumonia and broncho-pneumonia, 27; Bright's disease, 10.

St. Paul, 185,000. Report for March: Deaths, 178—55 under 5 years; death rate, 11.54. Deaths from tuberculosis, 21; pneumonia, 25; typhoid fever, 2; diphtheria and croup, 12; nephritis, 6; scarlet fever, 1; cancer, 6.

MISSOURI.—St. Louis, 645,000. Report for March: Deaths, 1,174;—218 under 5 years; annual death rate, 17.01. Deaths from measles, 7; zymotic diseases, 105; scarlatina, 7; diphtheria and croup, 14; typhoid fever, 20; whooping-cough, 5; erysipelas, 12; consumption, 127; pneumonia, 219; bronchitis, 51; other diseases of the respiratory organs, 37; diseases of the circulatory system, 85; Bright's disease and nephritis, 56; cancer, 26.

NEW HAMPSHIRE.—The State Board of Health Bulletin for April reports the work of the Food Laboratory, H. E. Barnard, chemist:

Of 290 articles examined, 139 were adulterated, or varied from the legal standard. This is equivalent to an adulteration of 47.9 per cent. It must be remembered, however, that in collecting samples for analysis care was taken to collect articles of a suspicious character. Therefore the extent of adulteration of all food products is not shown by this figure, and is represented by a much smaller percentage. Apple juice, sweetened, colored, flavored, and preserved, finds ready sale in enormous quantities as raspberry, strawberry, and currant jellies and jams. A recent addition to this class of goods is a "pie filling," which is sold largely to the baker trade. It is similar to the imitation butters and jams in appearance and composition, and consists of a mixture of apple juice, starch, butter, eggs, glucose, and a small amount of pulp or grated rind of the fruit represented. This product is found on our markets labeled "Lemon Preserves," and is a typical illustration of misrepresentation.

Samples of "Orange Blossom Honey," guaranteed "strictly pure," and of "Pure Extracted Honey" have been found to consist entirely of glucose or corn sirup. One sample of "Pure California Honey," marked, "This sample contains a small amount of cane sugar, added to prevent crystallization," contained nearly forty per cent. of cane sugar. Honey compounds purporting to contain from twenty-five to fifty per cent. of honey proved to be corn sirup in which a piece of extracted honeycomb was immersed.

"Maple Syrup."—If every farmer in New Hampshire owned a grove of maple trees and made each spring all the maple sugar and syrup possible, the amount produced would hardly equal the quantity sold each year as pure maple sugar or syrup. It is undoubtedly true that even in New Hampshire, a large producer of maple products, four-fifths of the sugar and syrup sold in our markets is wholly or in part fraudulent. An inspection of three maple syrup bottling houses in the city of Manchester which were producing large quantities of "pure maple syrup," showed that their product was a dilute cane syrup colored with caramel, to which about twenty per cent. of melted maple sugar had been added. Another manufacturer had dispensed with maple sugar entirely, and was branding a mixture of cane syrup and corn syrup as "Pure Maple Syrup." A sample of "Cream Maple Sugar" sell-

ing for a high price as a superior article proved to be brown sugar and glucose.

"Jellies" and "Jams."—Of 128 samples of jellies and jams examined at the food laboratory of the State of Michigan during the past year but seven were free from adulteration; of 78 samples examined at the New Hampshire laboratory of hygiene 29 were pure and 49 adulterated.

The base of the imitation fruit jelly, jam, etc., is apple juice or apple pulp, obtained principally from the waste parings and cores of the apple drying or evaporated apple factory. These waste products are partially dried at the factory, packed in bales or barrels, and shipped to the manufacturer of fruit products at a very low cost. Upon arriving at the factory the stock is boiled for a time in open kettles and then placed in large, closed, copper kettles and heated by blowing with superheated steam until the clear apple juice drains out of the mass to the bottom of the kettle. It is then drawn off into tanks, and serves as stock for making all varieties of jellies and preserved fruits.

New Jersey.—Hudson County (Jersey City and environs), 421,692. Report for year 1903: Deaths, 7,574—2,358 under 5 years; death rate, 18.0. Deaths from croup, 64; diphtheria, 167; measles, 0; scarlet fever, 52; whooping-cough, 39; typhoid fever, 59; smallpox, 2; all zymotic diseases, 785; phthisis, 899; bronchitis, 160; pneumonia, 924; cancer, for last seven months, only 107; violence, including accidents and suicides, 471; railroad injuries, 106; still births, 615.

If the inhabitants of Hudson County had died in 1903 at the rate of mortality which prevailed from 1875 to 1896 (both inclusive) the period during which old supply Passaic water was used in Jersey City and some other parts of the county, there would have been 10,205 deaths, instead of 7,574, a saving of 2,631 lives in 1903. The average annual death rate of Hudson County from 1875 to 1896, both inclusive, was 24.2 per 1,000 living. In the years from 1897 to 1903, inclusive, the average annual death rate was 18.8 in Hudson County, an annual reduction of 5.4 deaths per 1,000 persons.

Another interesting fact is the very notable reduction in death rate from typhoid fever in Jersey City since new water supply in 1896. In 1891, for example, the typhoid fever death rate was seven times as great as in 1903.

OHIO.—Sanitary Bulletin, March-April, 1904. For the most part, proceedings of the fourteenth annual meeting of the State and Local Boards of Health, at Columbus, January 21 and 22, of practical interest to health authorities generally.

Cases of and deaths from infectious diseases reported to State Board of Health during 4 weeks, ended April 19, 1904, 60 places, with an aggregate population of 1,194,018: Croup and diphtheria, 216 cases, 24 deaths; scarlet fever, 113 cases, 4 deaths; typhoid fever, 353 cases, 79 deaths; whooping-cough, 21 cases, 2 deaths; measles, 1,138 cases, 17 deaths. Smallpox, 349 cases, 19 deaths. January 1, 1904, to April 9, in 160 places, 1,945 cases, 63 deaths.

Cleveland, 430,000.—Report for March: Deaths, 678—97 under 5 years; annual death rate, 18.91. Deaths from typhoid fever, 50; diphtheria and croup, 16; tubercle of lungs, 55; pneumonia, 73; broncho-pneumonia, 19; bronchitis, 18; cancer, 20; heart diseases, 25; Bright's disease, 39; early infancy—congenital icterus, debility, etc.—48; senile debility, 29.

PENNSYLVANIA.—Philadelphia, 1,408,154. Report for week ended May 7: Deaths, 572—119 under 5 years; annual death rate, 21.15. Deaths from typhoid fever, 38; Bright's disease, 41; consumption, 86; diphtheria and croup, 9; measles, 3; scarlet fever, 3; diseases of the heart, 54; pneumonia, 66; broncho-pneumonia, 20; cancer, 17; smallpox, 5.

Report on contagious diseases, compared with that of the previous week:

	Week ended April 30.		Week ended May 7.	
	Cases.	Deaths.	Cases.	Deaths.
Smallpox	23	8	26	5
Diphtheria	71	9	71	9
Scarlet fever	89	6	102	3
Typhoid fever	298	45	277	38
Consumption	...	73	..	86

Pittsburg, 354,000. Report for the week ended April 30: Deaths, 157—54 under 5 years; annual death rate, 23.06. Deaths from diphtheria and croup, 5; whooping-cough, 2; measles, 2; scarlet fever, 2; typhoid fever, 7; tuberculosis, 19; pneumonia, 20; cancer, 3.

PHILIPPINE ISLANDS.—Report of the operations of the Board of Health for the month of December, 1903: The most important

causes of mortality in the city of Manila during the month, with the number of deaths therefrom, were as follows:

Convulsions of children, 331; pulmonary tuberculosis, 73; eclampsia, nonpuerperal, 65; acute bronchitis, 56; chronic bronchitis, 37; beri-beri, 34; meningitis, 26; diarrhœa and enteritis, 23; congenital debility, 23; senile debility, 21; dysentery, 15; malarial fevers, 15; cardiac disease, 13; Asiatic cholera, 11; typhoid fever, 10; acute nephritis, 6; pneumonia, 5; tetanus, 5; plague, 2; smallpox, 2.

Both cases of plague occurred in Filipinos, who were dead when found. The two deaths from smallpox occurred in Americans, a class in which this disease assumes an unusually severe type.

The deaths from cholera were reduced during the month to 11, there being a gratifying reduction from the 26 deaths from this cause in November, the 118 in October, and the 263 in September. It is confidently anticipated that with continuance of the present measures the infection of cholera will be practically eradicated from the city during the month of January.

Of the total deaths reported in the city during the month, 60.6 per cent. occurred in children who had not completed the first year of life. Of the total deaths occurring among the Filipino class of the population, 65.8 per cent. occurred among children less than 12 months of age.

RHODE ISLAND.—Newport, 23,000. Board of Health report for April: Total deaths, 28—2 under 5 years. Deaths from tubercle of the lungs, 2; general tuberculosis, 1; organic heart diseases, 3; pneumonia, 7; cancer, 2; senile debility, 4; annual death rate, 14.61.

WASHINGTON.—Seattle, 135,000. Department of Health report for March: Total deaths, 110—23 under 5 years. Annual death rate, 9.72. Deaths from pulmonary tuberculosis, 11; scarlet fever, 3; diphtheria, 3; typhoid fever, 3; cancer, 4; organic heart diseases, 13; pneumonia, 10; broncho-pneumonia, 5; Bright's disease, 2; senility, 4.

WISCONSIN.—Milwaukee, 315,000. Report for March: Deaths, 439—156 under 5 years; annual death rate, 15.89. Deaths from typhoid fever, 5; diphtheria, 7; phthisis, 41; pneumonia and broncho-pneumonia, 74; bronchitis, 18; cancer, 21; organic heart dis-

ease, 27; Bright's disease, 20; congenital debility, 35; senile debility, 20; violence, 23.

STUDYING YELLOW FEVER IN SOUTH AMERICA.—Two physicians of the Hamburg Institute for Tropical Diseases—Messrs. Otto and Neumann—have gone to South America for the purpose of studying yellow fever. They are supplied with considerable means furnished by shippers and merchants of Hamburg. In addition to scientific studies they are to collect information with reference to the new preventive measures now used in South America against yellow fever, and to devise means to prevent the heavy damages which the German merchant marine has suffered in the several years of yellow-fever epidemics. Further investigations of the subject are of great interest to Hamburg, as being in especially close connection with the countries infected with yellow fever.—Richard Guenther, Consul-General, Frankfort, Germany, February 9, 1904.

REMOVED THE GERMS.

Mr. B.—Did you take any money out of my pockets last week, dear? I've missed a roll of bills.

Mrs. B.—Yes, Charlie, I did. You know they say that old bills are so full of bacteria it isn't safe to carry them at all; and they were all awfully old ones.

Mr. B.—And did you sterilize them thoroughly?

Mrs. B.—I think I did.

Mr. B.—How?

Mrs. B.—Why, I exchanged them at the tailor's for a new spring suit.—"Detroit Free Press."

SANITARY BAKEHOUSES.—A number of bakehouses have been closed since the first of the year owing to the fact that they have not complied with the new sanitary regulations, which have been adopted by the London borough councils to bring about purer bread.

A campaign against unsanitary bakehouses has been pursued for several years, and a number of acts were passed to bring about reforms, but all failed to bring about better conditions. The new law hands over the supervision of underground bakehouses to the borough councils. If it fails to bring about a drastic reform in sanitation, the next step will be, some medical officers think, municipal bakehouses, where all bread is made by machinery.

There are 30,000 bakers in London, and their occupation is so unhealthy that they come third on the list of trades in suicides, seventh in alcoholism, and eleventh in liver disease.

Scientists took loaves from cellar bakehouses and cultivated micro-organisms from the bread.

FIREPROOFING WOOD.—Increased attention is being paid to the problem of rendering wood and other easily inflammable substances fireproof. From reports in the German press it would seem that the process of a Mr. Gautsch, of Munich, is very successful. The timber to be treated is placed in a vacuum, produced by pumping out the air. The cells are thereby freed of air and the wood is then impregnated under pressure with a solution of sulphate of ammonia and borax ammonia. The color, texture, or density of the wood is not affected thereby. The process renders it fireproof and proof against decay.—Richard Guenther, Consul-General, Frankfort, Germany, February 29, 1904.

CO-OPERATIVE AGENCIES FOR THE EXTENSION OF THE REGISTRATION AREA AND IMPROVEMENT OF VITAL STATISTICS IN THE UNITED STATES.

AMERICAN MEDICAL ASSOCIATION.
DR. FRANK BILLINGS, Chicago, President.
DR. JOHN H. MUSSER, Philadelphia, President-Elect.

Section on Hygiene and Sanitary Science.
DR. GARDNER T. SWARTS, Providence, Chairman.
Atlantic City, N. J., June 7-10, 1904.

AMERICAN PUBLIC HEALTH ASSOCIATION.
DR. CHARLES J. FINLAY, Havana, Cuba, President.
Havana, Cuba, December —, 1904.

CONFERENCE OF STATE AND PROVINCIAL BOARDS OF HEALTH OF NORTH AMERICA.
DR. JOHN N. HURTY, Indianapolis, President.

UNITED STATES PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE.
DR. WALTER WYMAN, Surgeon-General, Washington, D. C.

UNITED STATES BUREAU OF THE CENSUS.
HON. S. N. D. NORTH, Director, Washington, D. C.
HON. W. A. KING, Chief Statistician for Vital Statistics, Washington, D. C.

ANNUAL CONFERENCE OF STATE AND TERRITORIAL HEALTH OFFICERS WITH THE UNITED STATES PUBLIC HEALTH AND MARINE-HOSPITAL SERVICE.

To the Officers and Members of State and County Medical Societies:

This announcement is for the purpose of enlisting the co-operation of the organized medical profession of the United States in

the improvement of vital statistics in this country, and especially to secure their aid in promoting the adoption of adequate laws for the registration of deaths in the States that do not at present possess such legislation.

The great importance of such laws to the country as a whole, to the individual States and to private citizens, is indicated by the accompanying copy of a Joint Resolution passed by Congress and approved February 11, 1903.

Referring to this resolution of Congress, the American Medical Association, at its last annual session at New Orleans, on May 5-8, 1903, and upon the unanimous recommendation of the Section on Hygiene and Sanitary Science, adopted the following resolutions:

Resolved, That the American Medical Association heartily welcomes the action of Congress in promoting the adoption of complete and uniform systems of registration of vital statistics in the United States, and congratulates the American Public Health Association and the U. S. Census Office on their useful and effective co-operation for this purpose.

Resolved, That the American Medical Association strongly urges on the State medical societies that special committees be appointed to advocate and secure the passage of satisfactory registration laws in States that do not at present possess them, that county societies support and aid in the execution of such laws as far as possible, and that physicians individually, throughout the United States endeavor to promote the accuracy and value of the mortality statistics by giving clear and definite statements of causes of deaths on certificates of death:

Resolved, That the Committee on Public Health of the American Medical Association be instructed to co-operate with the corresponding committees of the American Public Health Association, the Conference of State and Provincial Boards of Health of North America, and with other committees organized for this purpose, and with the U. S. Census Bureau, the U. S. Public Health and Marine Hospital Service, and other branches of the Federal Government, in the work of promoting the adoption of suitable registration laws and the extension of the registration area, the proper compilation and presentation of vital statistics by States and cities in weekly and monthly bulletins and annual reports, the use of the standard certificate of death, and also in further work relating to the extension, improvement and practical use of the International Classification of causes of death, the dis-

position of jointly returned causes and preliminary work relating to its next decennial revision.

It is by the authority and under the express direction of the American Medical Association that this circular has been prepared by the Committee on Public Health and recommended to the attention of the officers and members of all State and county medical societies in the United States. It has been approved by the special committees of various National organizations co-operating in this work, and by the Federal authorities, and it is earnestly hoped that the entire medical profession of this country will give heed to this appeal and begin at once, in vigorous, systematic efforts in their own localities and through the perfected organization of the medical profession, to advocate the adoption of proper methods for the registration of vital statistics, and especially for the immediate record of all deaths as they occur, with their causes, by means of standard certificates of death and burial permits.

The absolutely necessary requirements of a satisfactory law for the registration of deaths have been formulated by the special committee of the American Public Health Association, composed of practical registration and sanitary officials, in co-operation with the U. S. Census Bureau, and have been fully indorsed by the American Medical Association and other co-operating agencies. They have been specially issued by the Census Bureau, in the form of a pamphlet entitled "Legislative Requirements for Registration of Vital Statistics," for the use of all who may desire to improve methods of registration. This relates chiefly to deaths, but a second pamphlet on "Registration of Births and Deaths" contains drafts of model laws for both purposes.

The essential requirements of a law for the complete and thorough registration of deaths may be summarized below, as taken from the authorities cited. It may be said, on the basis of all past experience in this country, that any proposed law or draft of a bill that does not comply with these fundamental requirements will prove inadequate and unsatisfactory in practice. Physicians should watch all such legislation and see that proper measures are adopted. It is better to have no law, or attempt at legislation, than one that is sure to produce only imperfect and worthless results, and that will merely bring registration methods and vital statistics into contempt.

These are the necessary provisions for a registration law for deaths:

1. Deaths must be registered immediately after their occurrence.

2. Certificates of death (standard form) should be required.

3. Burial or removal permits are essential to the enforcement of the law.

4. Efficient local registrars are necessary.

5. The responsibility for reporting deaths to the local registrar should be fixed.

6. The central registration office should have full control of the local machinery, and its rules should have the effect of law.

7. The transmission and preservation of returns should be provided for.

8. Penalties should be provided.

Include all of these provisions in a law and its results will be reliable; omit any one of them and the registration will be more or less defective and worthless.

It is not too early to begin work for the next legislative session. The first step, which should be taken without fail at the next annual session of the State Medical Society, is to appoint a strong committee—strong in interest in the improvement of registration and in ability to push the work, but preferably few in number—to organize the work in co-operation with the Public Health Committee of the Association and with the Census Bureau. This committee may correspond directly with Dr. Cressy L. Wilbur, Expert Special Agent of the U. S. Census Bureau, Lansing, Mich., who represents the Government authorities interested in the extension of registration, and is in direct touch with the Public Health Committee in its labors in pursuance of the resolution of the association. Dr. Wilbur will advise with the committees of any State in regard to the details of a proper registration bill, and will, when necessary, personally appear before medical societies, health officers' associations, legislative committees, etc., as may seem to be desirable for the purpose of advancing this work.

Please begin at once, and, if immediate results should not crown the first efforts, have your committee re-appointed at the next annual session, and fight it out until every State in the Union shall have an adequate registration of vital statistics. Our sanitary progress and the prevention of disease and deaths depend upon our knowledge of mortality and sickness, and it will be a glorious

achievement of the organized medical profession of this country if this grand result shall be brought about through its efforts.

Very respectfully,

The Committee on Public Health of the American Medical Association.

HEMAN SPALDING, M.D., *Chairman,*
Chief Medical Inspector, Chicago, Ill.

WM. C. GORGAS, M.D.,
Assistant Surgeon-General, U. S. Army.

W. H. SANDERS, M.D.,
State Health Officer, Montgomery, Ala.

J. N. HURTY, M.D.,
Sec. State Board of Health, Indianapolis, Ind.

VICTOR C. VAUGHAN, M.D.,
Memb. State Board of Health, Ann Arbor, Mich.

Approved:

The Committee on Demography and Statistics in their Sanitary Relations of the American Public Health Association.

WILLIAM A. KING, *Chairman,* Chief Statistician for Vital Statistics, U. S. Bureau of the Census, Washington, D. C.

CRESSY L. WILBUR, M.D., Chief of Division of Vital Statistics, Department of State, Lansing, Mich.

JOHN S. FULTON, M.D., Secretary State Board of Health, Baltimore, Md.

HENRY M. BRACKEN, M.D., Secretary State Board of Health, St. Paul, Minn.

JESUS E. MONJARAS, M.D., Mexico, D. F., Mexico.

FREDERICK L. HOFFMAN, Statistician Prudential Life Insurance Co., Newark, N. J.

The Committee on Vital Statistics of the Conference of State and Provincial Boards of Health of North America.

IRVING A. WATSON, M.D., *Chairman,* Secretary State Board of Health, Concord, N. H.

CHARLES A. LINDSLEY, M.D., Secretary State Board of Health, New Haven, Conn.

PETER H. BRYCE, M.D., Secretary Provincial Board of Health and Deputy Registrar-General, Toronto, Ont.

CRESSY L. WILBUR, M.D., Lansing, Mich., *Honorary Member.*

The Committee on Morbidity and Mortality Statistics of the Conference of State and Territorial Health Officers with the United States Public Health and Marine Hospital Service.

HENRY B. BAKER, M.D., *Chairman,* Secretary State Board of Health, Lansing, Mich.

GARDNER T. SWARTS, M.D., Secretary State Board of Health, Providence, R. I.

HENRY M. BRACKEN, M.D., Secretary State Board of Health, St. Paul, Minn.

United States Public Health and Marine Hospital Service—Treasury Department.

WALTER WYMAN, M.D., Surgeon-General, Washington, D. C.

S. N. D. NORTH, Director, Washington, D. C.

United States Bureau of the Census—Department of Commerce and Labor.

WILLIAM A. KING, Chief Statistician for Vital Statistics, Washington, D. C.

BIOGRAPHY OF A FOOL.

He didn't have time to chew
  The food that he had to eat,
But he washt it into his throat
  As if time were a thing to beat.
At breakfast and lunch and dinner
  'Twas a bite and a gulp and go—
Oh, the crowd is so terribly eager,
  And a man has to hurry so!
A bite and a gulp and away
  To the books and the ticker! A bite
And a drink and a smoke and a seat
  At a card table half of the night;
A pressure, a click and a pallor,
  A cloth-covered box and a song;
A weary old fellow at forty,
  Who is deaf to the noise of the throng.

—"Chicago Times-Herald."

BOOK REVIEWS.

ELEMENTS OF WATER BACTERIOLOGY, WITH SPECIAL REFERENCE TO SANITARY WATER ANALYSIS.—By SAMUEL CATE PRESCOTT, Assistant Professor of Industrial Biology, and CHARLES-EDWARD AMORY WINSLOW, Instructor in Sanitary Bacteriology, in the Massachusetts Institute of Technology. 12mo, x+162 pages. Cloth, $1.25. Order through your bookseller, or copies will be forwarded postpaid by the publishers on the receipt of the retail price. New York: John Wiley & Sons. London: Chapman & Hall, Limited. 1904.

The purpose of this book is to fill a gap in the literature of the subjects of which it treats. For, while recognizing the fulness with which bacteriology, chemistry and water analysis is treated in many works, and the opportunities given to students by lectures in various institutions, the authors have recognized the need of an elementary work, both as an introduction to the subject and as a manual for students. Though it has been especially prepared with reference to the course of study pursued in the Massachusetts School of Technology, it appears to be equally well adapted to similar courses of study in other institutions. Nevertheless, the authors would have it "distinctly understood that students using it are supposed to have had beforehand a thorough course in general bacteriology, and to be equipped for advanced work in special lines."

It is admirably arranged in ten comprehensive chapters: The Bacteria in Natural Waters; Quantitative Bacteriological Examination of Water; Interpretation of the Quantitative Bacteriological Analysis; Determination of the Number of Organisms Developing at the Body Temperature; Isolation of Specific Pathogenes from Water; Methods for the Isolation of the Colon Bacillus; Significance of the Presence of B. Coli in Water; Presumptive Tests for B. Coli; Other Intestinal Bacteria; the Significance and Applicability of the Bacteriological Examination, and an appendix upon the composition and character of the culture medium.

THE THERAPEUTICS OF MINERAL SPRINGS AND CLIMATES.—By BURNAY YEO, M.D., F.R.C.P., Emeritus Professor of Medicine in King's College, London; Consulting Physician to King's College Hospital; Hon. Fellow of King's College; Formerly Professor

of the Principles and Practice of Medicine and of Clinical Therapeutics in King's College, and Examiner in Medicine at the Royal College of Physicians. Author of "A Manual of Medical Treatment"; "Food in Health and Disease," etc. 12mo, 760 pages. Cloth, net, $3.50. Chicago: W. T. Keener & Co.

While this work makes no pretense to a systematic treatise on the therapeutics of mineral waters and climatology, and is without reference to the mineral springs and climate of the United States, it nevertheless so summarizes and describes the distinctive properties of the waters and climatography of the mineral springs of Great Britain and Europe, some distant sanatoria and benefit of sea voyages as to make it an exceptionally valuable manual. It is divided into two parts. I. Mineral Springs: their natural composition, classification, uses and mode of application. II. Climate and climate resorts and their differentiation, and sea voyages; the selection and application, sanatoria treatment, and a list of sanatoria.

RÖNTGEN RAY, DIAGNOSIS AND THERAPY. With 324 illustrations in the text. By CARL BECK, M.D. Professor of Surgery in the New York Post-Graduate Medical School and Hospital; Visiting Surgeon to St. Mark's Hospital and the German Poliklinik. Octavo. Cloth, $4.00. D. Appleton & Co., 436 Fifth Avenue, New York.

A pre-eminently useful book for a clear comprehension and practical application of Röntgen science. As it is only by a thorough knowledge of topographic anatomy that the Röntgen rays can be effectually utilized the author has amplified this necessity and demonstrated it by numerous lucid illustrations. In the part devoted to Röntgen therapy, the author has kept facts and conjectures well apart, appreciating the limitations of this new field of progressive medicine, which is still in a state of development.

The illustrations are excellent; so rendered by both the engraver's art and superior quality of the paper.

MANUAL OF MATERIA MEDICA AND PHARMACY.—Specially designed for the use of Practitioners and Medical Pharmaceutical, Dental, and Veterinary Students. By E. STANTON MUIR, Ph.G., V.M.D. Instructor in Comparative Materia Medica and Pharmacy in the University of Pennsylvania. Third edition, revised and enlarged. Crown octavo, 192 pages, interleaved throughout. Bound in extra cloth, $2.00 net. F. A. Davis Company, publishers, 1914-16 Cherry street, Philadelphia, Pa.

A concise treatise, but comprehending such knowledge of the natural history, classification and properties of materia medica, pharmacology and therapeutics as every physician and every pharmacist undoubtedly requires for intelligent practice. It is very conveniently arranged for ready reference, and the details of the subjects of which it treats are so clearly defined as to render it particularly facile for the student and useful as a handbook for both physician and pharmacist.

DIAGNOSIS FROM THE EYE.—A new art of diagnosing with perfect certainty from the iris of the eye the normal and abnormal conditions of the organism in general and of the different organs in particular. A Scientific Essay for the Public and Medical Profession. Illustrated by HENRY EDWARD LANE, M.D. Kosmos Publishing Co., 765 N. Clark St., Chicago.

"This book," the author says, "deals with pure and unadulterated knowledge." Such knowledge of mankind as to know there are some dupes subject to imposters who would live upon them. This is the only kind of knowledge apparent in the composition of the book.

THE FOUNDATION OF ALL REFORM.—A Guide to Health, Wealth and Freedom. A Popular Treatise on the Diet Question. By OTTO CARQUÉ. Kosmos Publishing Co., Chicago, Ill.

This essay comprehends better knowledge—at least suggests a better purpose—than the immediately preceding one. It adduces the common facts to show the capabilities of man to live upon an exclusively vegetable or animal diet, raw or cooked, mixed or varied, according to circumstances and his cosmopolitan conditions and adaptations. And the author is apparently honest in his effort to persuade people that they would enjoy better health and live longer if they would altogether exclude animal food from their diet.

REPORT OF THE STATE COMMISSION OF MASSACHUSETTS ON FISHERIES AND GAME FOR 1903.—EDWARD A. BRACKETT, Winchester, Mass., Secretary. A Comprehensive Account of the Process, Expansion and Expense of Fish Culture in the State; How the Hunting of Game May Benefit the State; Breeding Game Birds and Animals, Etc., with an Appended list of Superintendents of United States Fisheries Stations and of the several States; a document of much interest to all persons who would be informed on the importance of the subjects reported upon.

PUBLICATIONS RECEIVED.

Bird's-Eye View of the World's Fair. Robert A. Reid, Publisher, St. Louis, Mo.

Report of Friends' Asylum for the Insane. Frankford, Philadelphia.

Further Observations on the Treatment of Tuberculosis at Fort Stanton, New Mexico. Paul M. Carrington, M.D., Surgeon U. S. Public Health and Marine Hospital Service.

Rational Treatment of Pulmonary Tuberculosis, with Cases. F. M. Pottinger, Ph.M., M.D., Los Angeles, Cal.

Internal Medicine—To What Extent Required or Elective in the Medical Course. S. G. Bonney, A.M., M.D., Denver, Col.

The Sanatorium Treatment of Tuberculosis. Herbert Maxon King, M.D., Liberty, N. Y.

Pulmonary Malingering. W. T. English, M.D., Pittsburg, Pa.

Improvement in Iron Medication. Archibald Church, M.D., Chicago, Ill.

Treatment of Pneumonia. Delancey Rochester, M.D., Buffalo, N. Y.

How to Write a Medical Article; A Plea for Plagiarism. G. Frank Lydston, M.D., Chicago, Ill.

Treatment of Chronic Nontuberculous Inflammation of the Lungs and Pleura. Ernest L. Shurly, M.D., Detroit, Mich.

Practical Clinical Notes on the Administration and Action of 2,000 Nucleoid, or Organic Iodine. G. Frank Lydston, M.D., Chicago, Ill.

Bulletin M: The Floods of the Spring of 1903 in the Mississippi Watershed. H. C. Frankenfield, U. S. Department of Agriculture, Water Bureau.

CONTEMPORARY LITERATURE.

FEMALE EDUCATION AND THE BIRTH RATE.

"'The way in which they go.' There is no especial fault in the content of their education, primary, secondary, collegiate or university. There is no need of making their curriculum feminine, lest womanly instincts be dulled. It is the way of taking the schooling, the physical demands of it, that have been responsible for most of the invalids that I have happened to know. Alumna's fate was sealed when she was in the grammar school.

"When the bee larvæ are about a week old, you remember, it is determined whether they shall be queens or workers. It is simply a question of nourishment; the queen has an abundance of the best food; the worker has a limited supply of inferior quality. The result is a stunting of the reproductive bee.

"May it not be possible that a similar effect comes in some degree to our women from our school system? The grammar schoolgirl is a larva, if you please, at the age when she should develop a new system of her being, vital both to herself and to her race. To perfect these organs she needs all her rich, red blood, and all her nervous force. If the drain claims her whole vitality how can there be any proper development? Just as very young children should give all their strength for some years solely to physical growth before the brain is allowed to make any considerable demands, so at this critical period in the life of the woman nothing should obstruct the right of way of this important system. A year, at the least, should be made especially easy for her, with neither mental nor nervous strain; and throughout the rest of her school days she should have her periodical days of rest, free from any study of overexertion. Most schoolgirls have many unhygienic habits, all of which tend toward checking her development. Exactly these points were suggested in an editorial note in this magazine some months ago, I remember. The physical conditions and irregularities general among high-school girls are appalling, in reference both to their own enjoyment and to the larger interests of the race.

"But this is not an argument against our system of education in itself; the matter is not one for school boards to regulate. The intelligent fathers and mothers of our little schoolgirls of to-day are the only ones who can remedy these conditions. They can make the girl take one easy year, even though it means 'losing a grade,' the bugaboo of schoolgirls, and they can keep for her her needed day of rest throughout her course. Even a year's delay in graduation is not so bad as a dwarfing of development. To hear a schoolgirl speak to the question of her waiting a year, one would judge that existence out of her own particular class would necessarily separate her from all the desirable pupils in school. But those arguments—have you ever noticed?—are never employed when a girl is given a double promotion and advanced a class."—From "Alumna's Children, by an Alumna," "Popular Science Monthly" for May. Other valuable papers in the number: "The College of the West," by Prof. David Starr Jordan; "A Prefer-

ence in English Spelling," Dr. Edward W. Brown; "The Study of Physics," by Prof. Frederick E. Beach; "English Herbals," by Agnes Robertson; "The Geology and Geo-botany of Asia," by Prince P. Kropotkin; "The Royal Russian Academy of Science and the Fine Arts," by Edward F. Williams, and the usual summary, "The Progress of Science."

AFTER DEATH, LIFE.

We recoil from death. We resist its approaches. The instinct of life is strong and we struggle for continued existence. We look forward to coming years with hope, but are chilled when we see a point beyond which, seemingly, we cannot go. The cry of the soul is: "What shall I do that I may inherit eternal life?" Hence the preciousness of the Gospel. Life is its keynote. Life as over against death is its revelation. The hope of life is its inspiration. Not alone, but as involving all that life is revealed to be. It comes to us from the love of God; it is secured for us by the death of Christ; it will be to us the presence of God and fellowship with the redeemed forever. It is life on a higher plane, life in greater fullness, life forever. It does not spring from earth, it comes from God, and, therefore, lifts us up to God.

Jesus said, "I give unto them eternal life." This is repeated many times and in many forms. "He that believeth on the Son hath everlasting life." Jesus came that "whosoever believeth on Him should not perish, but have everlasting life." The nature of this life is explained in the conversation with Nicodemus: "Except a man be born from above he cannot see the kingdom of God." And it is further explained that this birth is of the Spirit. According to the universal law of descent this new life partakes of the nature of the Spirit, and is therefore eternal. It cannot die because "it is born of God." Death has no power over this eternal life, for Christ is our life, and because He lives we shall live also. Death is simply the opening door into the fullness of that which we already enjoy. We cannot give too great emphasis to this fact that eternal life begins in our generation. From the time we are born of the Spirit we live forever. "He that hath the Son hath everlasting life." Now, as well as in the world of spirits, we are children of God and partakers of His life. There is no break in the continuity of conscious existence; as the eyes close to the world about us, they open to the glories of the fullness of life with God.

In this transition only that which is of the earth will be lost. All

sin will be left behind, and all that responds to sin will cease forever. Temptation as we now feel it will be known no more. We will see Jesus as He is and will be like Him; we will see God and be pure in heart. The limitations of this union with the material will cease, and we will enter upon the spirit life unhindered by our present conditions. But all that is essential to our nature will remain; all that constitutes our personality will continue. We will "enter into life." Consciousness will remain; memory will continue to minister to life; the will power will be strong in perfect holiness; love will fill the heart and control all the faculties. We will be in a larger world of being, in touch with all that is holy and good, and all that ministers to happiness and well-being.

Life is a development. We grow in stature, we increase in knowledge, we enlarge in power. The child becomes a man. With the years we come into manhood and put away childish things. Old age may bring feebleness, because of the limitations under which we live, but in the freedom from these limitations, life, true to its nature, continues to advance in knowledge, in its powers, and in its blessedness. "Now I know in part, then shall I know even as I am known." We will be in the companionship of intelligent beings of our own and of higher orders. We will have knowledge of the wonderful works of God. We will have the experience of advancing years and enlarged thought. We cannot set any limit to this enlarging life. Ever and forever we will drink at the fountain; more and more, eternally we will receive the infinite stores of knowledge and wisdom.

This carries with it the activity that belongs to life. There will be no dormant powers then; there will be no unused energies; there will be no sealed chambers into which we may not enter. "His servants shall serve Him." Songs of praise will ever be on the lips, but they will be the songs of the faithful, who like the angels do His will. In what forms of activity life will manifest itself we cannot now know, for the things prepared for us are as yet beyond our highest thought, but it is against all we know of the spiritual life to suppose that our activity will be in such forms that we will simply be recipients of joy. The blessedness of life is not in being ministered unto, but in ministering. Increasing in knowledge, there will also be the communication of knowledge. Will not the saints in glory teach us who come after them the wonderful things of heaven and of love, of the universe and the works of God? Will not the minister continue to preach

the unsearchable riches of Christ? Will not parents unfold to their children the infinite love? Or children lead their late-coming parents into the beautiful paths of the Lord? Students we will be, with teachers who can make no mistake in their instructions. We cannot set bounds to the sphere of activity there, but we may well feel assured that the threads of life between the two worlds are not all broken, and that they who minister to the heirs of salvation bring tidings of great joy of the grace of God among those who are yet on earth.—"The United Presbyterian."

THE BIBLE.

I contend that we are not only on the point of impoverishing life and literature by the neglect of the English Bible, but that we have already impoverished life and literature. I am not dealing with a problem that lies in the future, I am speaking of a condition which is at hand. We are impoverishing life and literature by striking out of our life and our reading one great monument of our literature, the source from which much of what is best in later centuries is drawn, the inspiration upon which the best English style has been built.—NICHOLAS MURRAY BUTLER.

THE REVIEW OF REVIEWS for May is especially strong in its timely "news" features. It may be said that all the important topics of world interest at the present time receive treatment in the "Review" for May. It provides a group of entertaining and instructive articles on the Russo-Japanese war and cognate topics. In addition to the careful editorial treatment of the events of the month in "The Progress of the World," there is a sketch of the great sea-fighter, Admiral Togo, written by a Japansese, followed by "Fifty Years of Japan," from the pen of a Japansese journalist, Adachi Kinnosuke, who sums up in this paper the striking progress of his people during the half-century that has elapsed since the ships of Commodore Perry opened Japan to the influences of Western civilization. There are also brief summaries of "What the People Read in Japan," "Japanese Opinion of the American Attitude on the War," and "The Effect of the War on the Internal Affairs of Russia"; and Dr. Frank Waldo contributes an interesting résumé of "Climatic Features of the Field of the War."

The opening chapters of the May ATLANTIC are made brilliant and entertaining by the first installment of Professor Norton's series of "Letters of John Ruskin," illuminated by his own delight-

ful and illustrative comments and explanations. The series of articles on "Advertising," which has been so favorably received, is continued with a paper on "The Humors of Advertising," amusingly treated by Rollin Lynde Hartt. Other delightful essays are "An Hour with Our Prejudices," a characteristically humorous paper by Samuel M. Crothers; "The Work of the Woman's Club," by Martha E. D. White, and Bliss Perr's screed on "Fishing with a Worm," a very Waltonsey chapter written by a worthy disciple of the Gentle Art of Angling.

The June DELINEATOR contains a great deal of pleasant reading. Fashion's foibles, as here set forth by pen and pencil, are well designed to delight the feminine mind, as well as to prove a delusion and a snare to the masculine. There are besides a great many very pretty ideas in dresses for children, which will be welcomed by mothers. In the literary part of the magazine, the first place is given to a graceful Japanese tale, "The Giver of Honour," by Mrs. Hugh Frazer, a sister of Marion Crawford, which is refreshing in its sweetness and purity, and is sympathetically illustrated by Mr. C. D. Weldon. There are many other stories and articles for both little ones and grown folks and practical papers on domestic topics which go to make up a thoroughly readable number of this favorite magazine.

A CERTAIN NAVAL OFFICER was very pompous and conceited when on duty.

One day, when he was officer of the watch, and he could not, as usual, find anything of consequence to grumble about, he attempted to vent his spite on one of the stokers of the vessel who was in the engine room on duty.

Going to the speaking-tube, the officer yelled:

"Is there a blithering idiot at the end of this tube?"

The reply came quick and startling:

"Not at this end, sir!"

The feelings of the officer, as he turned away with a black frown, can be better imagined than described.

SUPERUNCONTRADISTINGUISHABILITIVENESS.

A person who hasn't the power
To distinguish the sweet from the sour,
Nor is able the sun from the shower
To easily guess,

Or one who's unable to tell
A rose from a cheese by the smell—
He has superuncontradistinguishabilitiveness.

Not to know at the critical time
The ridiculous from the sublime,
Not to know a Canadian dime
When it you possess,
Not to know that cold weather will freeze,
Or that hot weather won't—all of these
Show superuncontradistinguishabilitiveness.

This superuncontradistin-
guishabilitiveness is a thing
That's likely disaster to bring
Or remorse and distress;
In short, if you haven't the sense
To discover this poem's immense,
You have superuncontradistinguishabilitiveness.
—David H. Dodge, in the "New York Times."

PROCTOR'S THEATERS.

Elaborate arrangements have been made to meet the conditions and add to the safety and comfort of the patrons of Proctor's theatres during the summer season. Particularly worthy of commendation are the improvements at the One Hundred and Twenty-fifth Street Theatre, where among the decorations at the rear of each floor, a fountain has been added to the foyer of the orchestra floor. The evaporation from the constantly falling stream materially contributes to the coolness of the atmosphere.

It is also worthy of note that during the period for licensing theatres recently passed, not a single one of the Proctor houses was at any time in danger of losing its license, so careful Mr. Proctor has been to provide not only for the comfort but the entire safety of his patrons, and in such matters as interest the fire department and Health authorities, he has been in advance of restrictions; insomuch that when the Police Commissioner recently sat in judgment upon the various houses, although there were many threatened with extinction, Mr. Proctor's houses were not in any way molested. The Commissioner giving recognizance to the excellence of his management and the completeness of his system, so signally manifested on the outbreak of fire at the One Hundred and Twenty-fifth Street Theatre on the night of May 6.

Without the knowledge of any one in the theatre ("Herald" report) the fire had been burning for about ten minutes when Harry Brunell, the manager, was notified of it by several persons who saw the smoke and flames leaping from the windows of a storeroom on the top floor of the building fronting on One Hundred and Twenty-fifth street and directly in front of the theatre proper, from which it is separated by a four-foot fire wall.

Mr. Brunell hurried to the stage, and as he ordered the asbestos curtain to be lowered told the actors of the fire. Then, stepping into one of the boxes, he addressed the audience.

"There is not the slightest occasion for alarm," he said, "but I am informed that there is a fire in a neighboring building, and the Fire Chief advises that the audience leave the theatre, as in the course of time the fire may spread in this direction, and it is just as well to be on the safe side. I shall be obliged to you if you will quietly leave. All of the exits have been thrown wide open, and you will have no trouble whatever in getting out."

With a presence of mind which won him plaudits from the audience when they learned later how close the fire was to them, H. J. Smythe, leader of the orchestra, gave the signal to his men, swung his baton and an air which was familiar to every one was played with a rollicking swing.

Realizing the intent of it all, some one in the audience caught up the refrain, and the next moment a hundred voices were joining in the air.

Only one bit of excitement was furnished on the part of the audience, and that was immediately quelled. A man in the first balcony near the west side made a dash for an exit, shouting "Fire! Fire!" Hardly had the words passed his lips when he was felled by a blow from a stage hand and had to be carried out unconscious.

UNIVERSAL EXPOSITION AT ST. LOUIS.

DEPARTMENT OF SOCIAL ECONOMY—SECTION OF HYGIENE.

In all civilized countries, during the last three decades, public attention has been directed in a marked manner to the practical application of sanitary science to everyday life. Rural and municipal hygiene has made a great advance. In many European countries, practical sanitary laws have been passed and thoroughly enforced for the benefit of the people. In Mexico, progress of the highest order in public hygiene has been accomplished; also in

Peru, Chili, Argentina, and other South American countries. In the United States, all but three of the states have health laws and state boards of health, and commendable activity exists in disease-prevention work. Every town and city in most of these states has boards of health which are active in enforcing sanitation. Despite this progress, it is recognized that the great work is only begun. The possibility of preventing disease has been made plainly apparent, and therefore more imperative, by the science of bacteriology and the development of the germ theory and the discovery of some causes and methods of infection. The gathering together, therefore, of a comparative exhibit showing the best that has been done in hygiene the world over, is certain to result in a great lesson. Such exhibit will make it possible for all persons to see and comprehend the importance and extent of the subject of hygiene, and will furnish opportunity to hygienists themselves to enlarge and perfect their knowledge of the subject.

For the purpose of comparing the best methods and appliances known to sanitary science to secure health conditions and for the promotion and improvement of the principles of disease prevention, all foreign boards of health, all provincial, state and municipal boards of health, colleges and schools of hygiene, sanitary societies, publishers of books on hygiene, sanitary engineers, inventors of sanitary machinery and appliances, and, indeed, all who are in any way connected with hygiene work, are invited to make exhibits in this department.

Character and Scope of Exhibit.

A review of the classification which follows will give an idea of what the exhibit will include. As vital statistics constitute the foundation of hygiene work, special attention will be given to illustrating the subject. To this end, all the registration countries and states will be urged to make full exhibits. This will include their laws, rules, methods of collecting vital statistics, methods of tabulation, analysis and reporting. There will also be exhibited the health laws and rules of foreign countries and all the states; also city health ordinances, full sets of reports, methods of administration and results.

Hygiene literature, such as publications of sanitary associations, essays, works on hygiene and sanitary science, etc., will be on file. There are already promised, and now in course of preparation, full and costly exhibits illustrating the propagation of vaccine, diphtheria antitoxin, and all prophylactic serums. It is expected that

this exhibit will be of extra interest. Prominent sanitary engineers have promised to show plans, specifications, elevations and photographs of water-filter plants, both of the mechanical and sand-bed kinds; also of septic tanks, broad irrigation, sand filtration, and chemical methods of sewage disposal. Photographs, plans and specifications of plants already in operation will also be shown.

The foreign and home schools of hygiene will be fully represented, and this exhibit will be of unusual value—for all advance in hygiene, as in other sciences, lies in education and discovery. Emergency hospitals, sanitary tenements, sanitary dwellings, home sanitary appliances, garbage collection and disposal, ventilation, lighting and heating of school-houses, theaters, churches and other public buildings, railway sanitation, disinfection, disposal of the dead, etc., will all be completely illustrated.

A Hygiene Laboratory.

An important feature of the hygiene exhibit will be a modern, completely equipped, hygiene laboratory, in working operation. In it will be continually conducted all manner of actual chemical and bacteriological examinations which are required in modern disease-prevention work. Arrangements will be made with the health authorities of cities, towns and country within five or six hours' reach of St. Louis, to send in diphtheria and scarlet fever cultures, samples of blood for malaria and typhoid tests, sputum for pneumonia, influenza and tuberculosis tests; also waters for chemical and bacteriological examination, and food and drugs for chemical analysis. In addition to notification of results to the senders of specimens, bulletins will be issued for the inspection of visitors. It is expected the laboratory and its practical work will be valuable in showing to all officials and other citizens how necessary such an institution is if preventable diseases are to be efficiently opposed.

GROUP 140.

Class 791.—(*a*) *Sanitary Legislation.* Laws, ordinances, by-laws, rules, under which exhibiting health boards work.

Class 791—(*b*) *Investigation.* Explanation, records, charts, illustrations of investigations.

Class 791—(*c*) *Literature.* Reports of health boards, sanitary reports of national governments, works on hygiene and sanitary science, reports of sanitary societies, health circulars, essays on health, works on foods, etc.

Class 792—(*a*) *Prevention of Infectious Diseases.* Methods of discovery and reporting of incipient and pronounced cases of in-

fectious diseases, methods of isolation and quarantine, use of vaccines and prophylactic serums, disinfection, infectious disease hospitals and rules for management, laboratory work, destruction and exclusion of insects.

CLASS 792—(*b*) *Municipal Sanitation.* Street paving, street cleaning, garbage collecting, garbage disposal, sewers, sewer cleaning, hospitals, dispensaries, disinfecting stations, portable disinfecting apparatus, public drinking fountains, parks, public baths, public sanitaries, tenements.

CLASS 792—(*c*) *Sanitary Engineering.* Plans, specifications, elevations, photographs of methods of sewage disposal. Also plans, etc., of plants for the purification of water, as sand filtration, mechanical filtration, electrical purification. Plans of sewer systems, best materials for construction, etc. Descriptions and photographs of water sheds. Preservation of streams from pollution. Preventing smoke nuisances.

CLASS 792—(*d*) *School Sanitation.* Plans, elevations, specifications, photographs, illustrating sanitary schoolhouses. Medical inspection of school children, physical training, proper seats and desks, print of school books. Drinking fountains. Sanitaries.

CLASS 793—(*a*) *Industrial Sanitation.* Regulations governing the sanitary conduction of industries. Ventilation, warming and lighting of factories and work rooms. Fire escapes and other safeguards against accident and disease. Production of vaccines, prophylactic and curative serums. Car sanitation, boat sanitation, sanitary care of public vehicles.

CLASS 793—(*b*) *Home Sanitation in Villages and Country.* Plans, specifications and elevations of an ideal sanitary house or dwelling. Foundations, cellars, heating, ventilation, lighting, plumbing, disposal of sewage and slops, water supply, kitchen, bathroom, bedrooms, clothing, exclusion of dust and insects. All to be illustrated by drawings, models, photographs.

CLASS 793—(*c*) *Domestic and Public Hygiene Appliances.* Street cleaning machinery, garbage carts, models of garbage crematories, sections and models of street paving, ash and garbage receptacles, ventilating grates and stoves, furnaces, cooling appliances, domestic water filters, refrigerators, domestic water-stills, domestic garbage burners, commodes, earth closets, insect screens, etc.

CLASS 794—*Food and Drug Inspections.* Pure food and drug laws, rules and regulations for enforcement. Explanation of methods of collection of food and drug samples. Analyses, reports,

prosecutions. Printed reports of results. Amount of money allowed for the work.

CLASS 795—*Vital Statistics.* Laws, rules and ordinances governing the collection of vital statistics. Methods for collecting, tabulating, classifying, analyzing, etc. Forms of blanks used, published results and graphic charts. Calculation of death, sickness, birth and marriage rates.

CLASS 796—*Disposal of the Dead* (Earth Burial). History. Arguments for and against, with illustrations. Burial of bodies dead of dangerous transmissible diseases. Best kind of soil. Modern embalming with consequent retardation of destruction. Sites for cemeteries. *Cremation*—Literature concerning cremation. Photographs, plans, elevations, specifications of crematories; also descriptions and illustrations of furnaces and all accessories.

J. N. HURTY, M. D.
Superintendent Section of Hygiene.

AMERICAN INTERNATIONAL CONGRESS ON TUBERCULOSIS.

To be Held October 3, 4 and 5, 1904, Under the Auspices of the Universal Exposition, at St. Louis, 1904, and of the American Congress on Tuberculosis.

HONORARY PRESIDENTS:

Lay.	*Medical.*
Hon. John Hay,	Prof. Dr. M. Benedikt,
Hon. Gen. Russell A. Alger,	Dr. A. N. Bell,
Hon. Ex-Judge A. H. Dailey,	Prof. Dr. Chas. H. Hughes,
Hon. Judge C. G. Garrison,	Gen. Presley M. Rixey, M.D.
Hon. Stephen B. Elkins,	Gen. Nicholas Senn, M.D.

OFFICERS:

President, E. J. Barrick, M.D., Toronto, Ontario.

First Vice-President, F. E. Daniel, M.D., Austin, Tex.

Second Vice-President, Ex-Chief Justice L. Bradford Prince, Santa Fe, N. M.

Third Vice-President, Dr. Charles K. Cole, Helena, Mont.

Fourth Vice-President, Dr. Sofus F. Nelson, Pulman, Wash.

Fifth Vice-President, Dr. A. M. Linn, Des Moines, Iowa.

Secretary, Samuel Bell Thomas, 116 Nassau St., New York.

Treasurer, Clark Bell, 39 Broadway, New York.

THE SANITARIAN.

MY DEAR DR. BELL:

In compliance with your request for my appreciation of THE SANITARIAN from my viewpoint as associate editor for more than twenty years, on the eve of your retirement and the merging of THE SANITARIAN with "The Popular Science Monthly," I will endeavor to do so as tersely as I may by excerpts from its pages, with which I heartily concur, but to which I would add, if I could command words of more exalted significance.

THE SANITARIAN from the outset, indeed from its announcement by prospectus in February, 1873, for the terseness of its stated purpose, "to so present the results of the various inquiries which have been, and which may hereafter be made for the preservation of health and the expectations of human life, as to make them most advantageous to the public and to the medical profession; to awaken public attention to the extent of the field, and to the facts indicating how beneficently it may be cultivated, by showing the amount of ill-health and mortality from preventable causes of disease; by pointing out the nature of those causes and the way in which they operate; by showing that such causes are removable, and by exhibiting improved health, longevity and happiness as the fruits of their removal."

This announcement, as shown by the correspondence in the early numbers, attracted the attention of many distinguished members of the medical profession and other persons, who have here given thought to the possibilities of preventive medicine.

How well THE SANITARIAN has accomplished its purpose is measurably shown by letters addressed to the editor in June number (vol. 28), 1892, occasioned by an article in the same number taken from the "Brooklyn Medical Journal" of two months before, on "The Practical Sanitarian as Illustrated by a Life Sketch of A. N. Bell, A.M., M.D., by Stephen Smith, A.M., M.D., LL. D. The inference from Dr. Smith's article, written nineteen years subsequently to the advent of THE SANITARIAN, would, at first thought, seem to suggest that it was a sequel of what THE SANITARIAN had accomplished. But, on the contrary, it shows the basis of it, which the editor had taken no pains to make known at the outset of THE SANITARIAN, with evident purpose, as he in substance announced that THE SANITARIAN should speak for itself.

The general appreciation of it at that time, and it has in no respect lessened since, is abundantly shown by the letters referred to, in part, as follows:

ELMIRA, N. Y., May 6, 1892.

Editor of THE SANITARIAN:

It is needless to state that "all sorts and conditions of men" have profited by your labors in behalf of sanitary reform. Individually and through your journal sanitation, in the direction of school-children, has witnessed development from small beginning up to the present advanced state of knowledge on the subject, by which the health of innumerable pupils has been preserved and education made possible, which otherwise would have been unattainable. This is only a single instance of what has been accomplished by means of enlightened sanitary inquiry, which in the manner of "line upon line, precept upon precept, here a little and there a little," has forced itself upon the attention of the medical profession. This branch of inquiry, which is mentioned by way of illustration, including the site and construction of schoolhouses, water supply, drainage, cubic space, the admission of light, building of desks and seats, hours of study, and physical training, shows the scope of investigation which has characterized THE SANITARIAN during the many years its pages have teemed with questions of the most vital importance.

When we consider the wide range of topics that has filled the pages of THE SANITARIAN on questions embracing the health and welfare of the people, a summary is presented of the history of a particular field of inquiry, encyclopædic in character, which cannot be furnished in any other form. Indeed, the volumes of THE SANITARIAN constitute, in a shape available for ready reference, a complete presentation of what has been contributed to preventive medicine since you undertook to lead scientific investigation in the department you have been found so capable of illustrating.

WILLIAM C. WEY.

MEDICAL DEPARTMENT, TULANE UNIVERSITY OF LOUISIANA,

NEW ORLEANS, April 23, 1892.

DEAR DR. BELL: I take this opportunity to assure you of my highest appreciation of your erudition and experience as a sanitarian, and of the great value, unequaled in the United States, of your monthly publication, THE SANITARIAN.

STANFORD E. CHAILLÉ.

NEW YORK, May 2, 1892.

DEAR DR. BELL: I congratulate you on the well-merited tribute accorded you by Dr. Stephen Smith, in the April number of the "Brooklyn Medical Journal," and upon the ability with which you have conducted THE SANITARIAN, now in the twentieth year of its existence. Each successive number has shown your untiring devotion to preventive medicine, and to say that THE SANITARIAN occupies the first place among the periodicals of its class is very far from overestimating its value as a practical and popular educator in all matters relating to public health. On its pages have been reported from time to time transactions of the various learned bodies whose labors are devoted in whole or in part to the improvement of human conditions, thus bringing readers in close relation to the best thinkers and workers of the age. In turning over its leaves one finds that it has recognized and supported every public movement promotive of the interests and welfare of the people. This is especially shown by the energy it has displayed in the organization of national, State and municipal boards of health, and voluntary health associations as means of securing a wise system of sanitary administration, and creating a popular interest in those subjects which relate to the prevention of disease and the saving of life. Public health administration has at all times been carefully reviewed, and wherever criticism has been deserved, your dearest personal friends have not escaped the strictures of your just, even though it be somewhat caustic, pen.

The subject of house sanitation has at all times received due attention, and you have kept pace with the most advanced views on this important branch of domestic hygiene. The same may be said of school hygiene, in the advocacy of which you have always been found at the front.

In the field of scientific investigation your readers have been kept well informed of the results of bacteriological study, the gradual growth and development of the germ theory; the value, use, and methods of employing antiseptics and disinfectants, detailing at length the results of experiments in testing the relative efficiency of the several agents used in this department of sanitary science and effective practical work.

The growing interest in matters pertaining to public health which THE SANITARIAN has done so much to foster is seen in the public press, heard from the pulpit and platform, and is especially shown by the establishment of professorships in medical, literary and technical institutions.

But neither time nor space will allow me to notice the many other features which render THE SANITARIAN indispensable to one who reads it—as I have for the last nineteen years; but I venture to suggest that every practical sanitarian who has frequent occasion to refer to his back volumes will soon need an index volume to aid him in such reference. If such a volume could be prepared, giving a brief epitome of the more important articles, I am sure your subscribers would support you in the undertaking.

E. H. JANES.

(Assistant Sanitary Superintendent, Department of Health, New York.)

NEW YORK, May 3, 1892.

MY DEAR DR. BELL: I have read with great interest Dr. Stephen Smith's interesting account of your life and life-work as a practical sanitarian. Certainly no man in this country has done more than yourself to call public attention to the importance of general sanitation, and inculcating individual sound doctrines in your writings upon these important subjects will not be questioned by any sanitary expert.

I trust that your valuable journal, THE SANITARIAN, may remain under your direction for many years to come, in which case it will no doubt maintain the position which it has attained as the leading sanitarian periodical in America.

GEORGE M. STERNBERG,
Deputy Surgeon-General, U. S. Army.

COLDWATER, MICH., May 3, 1892.

MY DEAR BELL: I have read Dr. Smith's paper in the April number of the "Brooklyn Medical Journal." To show what THE SANITARIAN alone has done would require an index catalogue. If it were read and consulted, and the suggestions it suggests, the helps that help, and the advice that advises, applied in their usefulness, sanitation would be more advanced. Let us be thankful that you have done so much so worthily. T. J. TURNER,
Medical Director, U. S. Navy.

To the foregoing—and I wish I had room for more—permit me to add a condensed abstract of your address at the "Quarter Centennial Celebration of the Michigan State Board of Health," August 9, 1898. It is a virtual summary of the status of sanitary science at the end of the last quarter of the nineteenth century:

and, it appears to me, eminently suited to the merging of THE SANITARIAN with its contemporary, *"The Popular Science Monthly."*

A QUARTER CENTURY OF SANITARY WORK.

" . . . For, while I concur with the general belief that of all the centuries since the first one of the Christian era, there has been greater progress in civilization in the present one than in any other, I venture to think, and shall endeavor to show, that of all the pursuits of knowledge that have contributed to human welfare, preventive medicine excels; and the more because it has been the chief means by which the art of medicine has been transformed into a science.

"The advent of cholera in England in 1831, despite the quarantine regulations which at that time obtained, gave Edwin Chadwick occasion to observe that whatever infections property there might be in the disease, it was particularly prone to prevail under filthy conditions.

"It was no new thing that dirt propagated disease, but why had never been searched for. And the good results of the energy displayed by Mr. Chadwick and his co-workers appears for the time to have stifled scientific inquiry.

"It is an especially noteworthy circumstance that the General Board of Health did not then have, and had not had hitherto, a medical man among its members or officers. And that it did not have a medical member until in 1850.

"Dr. Rumsey, referring to this subject some years later in the preface of his 'Essays on State Medicine,' speaks of it in the following terms: 'Who would have thought that in the last decade of advancing civilization, and in a nation boasting of its intellectual and material resources, of its administrative energy and efficiency, the whimsical experiment should have been actually tried of appointing three non-medical authorities—two lords and a barrister—to preserve the health of the living; and then, after a year or so of doubtful success, calling in a physician to bury the dead."*

"Indeed it appears that what Lord Bacon said of the medicine of his day, that it stood for judgment on quite different merits than did other learned pursuits, was scarcely less true at the beginning of this quarter-century than at the time of his utterance.

" 'Other arts and sciences,' he said, 'are judged of by the power

* English Sanitary Institutions. John Simon, p. 219.

and ability exhibited in the conduct of them by their professors, and not by success or events. The lawyer is judged by the skill of his pleading, not by the issue of the trial; the pilot by his skill in directing the course of his ship, not by the fortune of the voyage. But the physician can form no particular act by which his ability can be directly demonstrated, and therefore he is principally judged by the result, which is very unjust. For who shall decide, if a patient die or recover, whether the good or the evil is brought about by art or by accident? Whence imposture is frequently extolled and virtue decried. Nay, the weakness and credulity of men is such that they often prefer a mountebank or a cunning woman to a learned physician. So the accidents made Æsculapius and Circe brother and sister and both children of Apollo. Hence,' he adds, 'physicians say to themselves, in the words of Solomon: "If it befall to me as befalleth fools, why should I labor to become more wise?" And therefore one cannot wonder that they commonly study some other art or science more than their profession, because they find the mediocrity and excellence in their own art makes no difference in profit or reputation, for man's impatience of diseases, the solicitude of friends, the sweetness of life, and the inducements of hope, make them depend upon physicians with all their defects.'

"With a few exceptions, this estimate of the art of medicine by Lord Bacon obtained until the eve of the quarter-century of our particular consideration. Omitting the rest, one exception is preeminently worthy of mention—Jenner's discovery of vaccination—for never was discovery more thoroughly demonstrated on a scientific basis than this, based on a considerable period of observation and repeated experiments before it was announced. It was a contribution toward, though not to, the science of medicine. It stood alone for half a century.

" 'The vaccine disease, in my opinion, is not a prevention of the smallpox, but the smallpox itself—that is, the horrible form under which it appears in its contagious state is (as I conceive) a malignant variety. Now, if it should ever be discovered that the plague is a variety of some milder disease, generated in a way that may even elude our researches, and the source should be discovered whence it sprang, this may be applied to a great and grand purpose. The phenomena of the cow-pox open many paths for special action, every one of which I hope may be explored.'

"Yet there was no attempt made to attenuate other diseases besides smallpox, as suggested by Jenner, until it was brought about

by Pasteur's researches into the causes of certain forms of disease in French vineyards. There were earlier discoveries of bacteria by Leeuwenhœck and others, in almost every kind of organic matter in process of decomposition, but the part they played in disease was not even hinted at.

"In 1840 Henle announced that the cause of miasmatic infective contagious diseases must be looked for in similar minute living organisms. He was unable to offer any satisfactory experimental proof of his theory, however. But his argument in favor of it created a profound impression, and from that time forward greatly increased attention was given by medical and other microscopists to all infective diseases.

"In 1862 Pasteur published his paper on organized corpuscles existing in the atmosphere, and by a series of experiments showed that unless organisms were introduced into the organic fluids from without, by some means or other, no putrefaction could take place —that is, until some organisms were present which could grow and multiply in the fluid, no evidence of organic life would make its appearance.

"This paper of Pasteur on 'Organized Corpuscles in the Air' was the prelude to Professor Lister's experiments on the antiseptic treatment of wounds, first undertaken three years after Pasteur's paper. His experiments at the first were crude and difficult of application, but with a persistence commensurate with his nobleness of purpose, after two years' perseverance he had rendered them so facile and so successful in his hands that, in 1867, he insisted upon the importance of excluding special bacterial organisms from wounds.

"It is no disparagement of the brilliancy of the results of following Professor Lister's practice in the application of knowledge of disease germs and germicides, *drawn from the store of facts developed by sanitary work*, to surgical procedure, to invite attention to the even more brilliant results that have followed the like recourse to Professor Lister's by medical practitioners. The brilliancy of the surgical results is more apparent only because it is more easily demonstrated than the results of medical practice.

"In 1872 Bollinger demonstrated the presence of spores in the bacillus anthracis. He also showed that if blood from a cow affected with splenic fever were kept for some time, the rods disappeared, but the blood still retained its virulence. This virulence he attributed to the presence of spores, which, though remaining inactive under unfavorable conditions to the existence of the anthrax

bacillus, still retained their vitality; and by the recurrence of conditions favorable to their development they assumed the form of the bacillus and were then capable of setting up the disease. He pointed out the important bearing of this retained vitality of germ spores on the question of infection of the soil; and, by indicating that the so-called epidemic diseases were due to the fact that the conditions were favorable or otherwise—perhaps intermittently—for the growth and development of anthrax organisms, he not only discovered the etiology of those diseases, but, by pointing out the conditions under which the vitality of their germs were maintained, he displayed the feasibility of preventing or stamping out such diseases by sanitary work.

"Closely related in substance to Bollinger's discovery were Dr. George M. Sternberg's observations on the soil in New Orleans, as reported by him to the National Board of Health in 1881. 'The fact observed by myself,' he says, 'that during the summer months the mud in the gutters of New Orleans possesses an extraordinary degree of virulence, shows that pathogenic varieties of bacteria are not alone bred in the bodies of living animals. The more I study this subject the more probable it seems to me that in this direction lies the explanation of many problems which have puzzled the epidemiologists, and that the sanitarians are right in fighting against filth as a prime factor in the production of epidemics—a factor of which the rôle is easily understood, if this view is correct. The presence of septic organisms possessing different degrees of virulence, depending upon the abundance and kind of papulum furnished them, and upon meteorological conditions more or less favorable, proves, in my opinion, the epidemic constitution of the atmosphere, which wise men were wont to speak of a few years ago as a cloak of ignorance. It must be remembered that the gutter mud of to-day, with its deadly septic organisms, is the dust of to-morrow, which in respiration is deposited upon the mucous membrane of the respiratory passages of those who breathe the air loaded with it.'

"Moreover, foremost in sanitary work for the time being, in the quarter-century of our contention, was that as a whole, which the paragraph just above quoted brings to mind, the work of the National Board of Health during the period of its active existence, 1879-81. How earnestly and successfully it battled with and stamped out the yellow fever in Memphis and New Orleans, is popular history. But this was but a mere item of its work. It promptly revised the situation and appointments of the quarantines

of the Southern Atlantic and Gulf ports; established refuge stations for infected vessels; instituted sanitary inspection of vessels, railways coaches and persons at infected ports and places of departure; established a sanitary police of the lower Mississippi, in time of yellow fever at any port or landing place thereon; required thorough cleansing, disinfection and aeration of all houses, river vessels and boats, in which there had been cases of yellow fever. To notice in detail the investigations made by Drs. Chaile and Sternberg in fevers; Drs. Wood and Formand on diphtheria; Professors Remsen and Smyth on the dangers of carbonic oxide and soil gases; Professors Mallet, Martin and Pumpelly, on the organic matter in potable water; Colonel Waring and Mr. Bowditch's report on sewerage and drainage in the United States; Mr. Rudolph Herring's report upon sewerage works in Europe, and many other scientific investigations conducted under the auspices of the Board and their practical results, would require much more space than this occasion affords.

"In 1875 Klebs first described the bacillus of typhoid fever, and again, with Eberth, more accurately, in 1880; in 1884 Koch demonstrated the bacillus of cholera, and Loeffler that of diphtheria; but it is needless to pursue this category, literature with which we are all familiar is filled with it. Equally important to our contention is the relation of these discoveries to measures for their prevention or destruction. Hitherto the use of disinfectants had been an art only and empirical. Certainty of their utility awaited their application to disease germs as a test of their efficiency, and thus disinfection has become a scientific procedure. Steam had been used to a limited extent and had won the confidence of all who used it by its recognized result as an efficient disinfectant, for many years, but it was not until 1884, when Dr. Sternberg reported that by actual experiment it was fatal to all of the pathogenic and non-pathogenic organisms tested, in the absence of spores (with the single exception of sarcina lutea), at a temperature of 143.6°, which placed its use on a scientific basis, that it has since that time been generally accepted.

"Efforts for the protection and purification of water supplies seem to have awaited conditions somewhat analogous to the use of disinfectants—the discovery of disease germs in polluted water. At any rate, it is only since the discoveries of Eberth and Koch that chemists and engineers have become convinced that sewage is unwholesome, no matter how much diluted.

"Allied to the protection of the water supplies is the protection

of milk and other food supplies, which has been a signal illustration of sanitary work, State and local, so extensive and so generally acknowledged as to require no details.

"And what may now be said of the crusade that has but just now begun, as it were, against tuberculosis, omitting any attempts to discuss that phase of it which has been in progress for several years in the destruction of cattle—further than to rivet attention, if possible, to the liability of children to intestinal tuberculosis, and since children are the great milk consumers—to insist upon this fact as a sufficient justification of the destruction of tuberculous cows, and for the most rigid supervision of the milk supply by the sanitary authorities.

"But our present reference is more particularly to Koch's discovery of the tubercle bacillus fifteen years ago. And since the recognition of the communicability of tuberculosis by the inhalation of the baccilli from the dried dust of the sputum of consumptives, the question of how to prevent this danger with the least possible inconvenience to the afflicted is one of the most important problems of practical sanitation. That there are various means adaptable to the different conditions of exposure and the proper care of consumptives, subject to sanitary supervision, every sanitarian knows. And the salutary results are proven by the diminishing death rate from consumption wherever it has been imposed. The restrictive measures of sanitary authorities in this regard have been an educational force among the people at large. And no persons have become more keenly alive to the danger of tuberculosis sputum than consumptives themselves, who would be the last to afflict in like manner those who are dear to them or other persons. While, therefore, their sensitiveness in this regard should always be respected, the day has gone by—even with them—when such sensitiveness should be an obstacle to the protection of human life. Consumption is no longer regarded as a family disease—much less a community disease—but a personal one; a disease that is ordinarily contracted by inhaling the dust of dried sputum, and above all by persons whose resisting powers are below par from any cause, though no person, however well, can be considered absolutely exempt from the danger of such exposure.

"When we consider that an impure atmosphere is one of the most favorable conditions for the propagation of tubercle bacilli and reflect upon the facility of their reproduction and marvelous distribution, we may well wonder how is it possible to escape them. Indeed, it is impossible. But from the scientific basis on which

preventive medicine rests, we can fight them, and though we may not be able to subdue and conquer them, we can so cultivate our powers of resistance to them as to measurably defy them.

"*Stamina* is an educational force of primary importance to both body and mind. All understand that a pure atmosphere is essential to the maintenance of health. But, owing to the wonderful facility which the human body possesses of accommodating itself to circumstances, it frequently happens that school assemblies breathe a most unwholesome atmosphere day after day, or perhaps for weeks, without apparently suffering from it, while one after another of the pupils is continually dropping out—overtaken by some epidemic disease.

"Sanitary work has been not only eminently successful in the promotion of school hygiene in the United States during the era of our consideration, so evident that he who runs may read, but it has concerned itself with eminent success in the promotion of medical education.

"All of our State laws for the prevention of quackery, commonly designated Medical Practice Acts, are chiefly, if not wholly, due to the influence of our State Boards of Health. With special reference to the leading spirit in the promotion of the Medical Practice Acts, the late John H. Rauch, we know of no better description of the relation of such Acts to sanitary work than the summary prefacing the Sixth (1883) Annual Report of the Illinois State Board of Health:

"'Boards of Health are created and maintained for the conservation of the interests of health and life. Ordinarily their functions are limited to dealing with sanitary questions; with the removal of the causes of preventable disease and premature death. This Board, however, is also charged with the execution of the Act to regulate the practice of medicine in the State; and thus the medical profession, one of the most important agencies which is concerned with the interests of health and life, is brought within the scope of sanitary legislation. To improve the status of the individual practitioner, and to develop a well-trained and thoroughly educated medical profession, must result in increasing the value of this force in sanitary science and public hygiene; a force which in the nature of things must always exist so long as there are physicians and patients; and the character and influence of which must always hold a direct relation to the tone, attainments, and the competency of those by whom it is exerted.'

"In an address Dr. Rauch delivered as Chairman of Section of

State Medicine, at the session of the American Medical Association in 1886, he submitted certain propositions which he considered germane to needful action of that body in the promotion of the highest attainable standard of medical education, and in order to give practical effect to them he specifically suggested:

"'That the American Medical Association should put itself upon record at that session as recommending the extension of the period of study to four years, and of attendance upon lectures to three full terms, with ample hospital-practice and clinical instruction, as the requirements for graduation in medicine.'

"The Association did not so put itself upon record until six years afterward. But Dr. Rauch ceased not to so urge to the day of his death. At the recent meeting of the Association in Denver Dr. Rauch's suggestion was unanimously adopted by special resolutions.

"Well did Tyndall observe, as a physicist twenty-three years ago: 'If recent theories on the propagation of disease by germs were proved to be correct, and if the laws which govern the propagation or destruction of those germs were known, the art of the physician would be raised from dependence on empirical observation into the position of an exact science. * * * For never before,' he said, 'was medicine manned and officered as it is now. * * * On the old Baconian lines of observation and experiment the work is carried on. The inter-communication of scientific thought plays here a most important part. * * * While physiologists and physicians in England and elsewhere were drawing copiously from the store of facts furnished by the researches of Pasteur, that admirable investigator long kept himself clear of physiology and medicine. * * * The union of scientific minds is, or ought to be, organic. They are parts of the same body, in which every member, under penalty of atrophy and decay, must discharge its due share of duty imposed upon the whole. * * * In observational medicine one fine piece of work may be here referred to—the masterly inquiry of Dr. Thorne into the outbreak of typhoid fever at Caterham and Redhill. Hundreds were smitten by this epidemic and many died. The qualities of mind illustrated in Dr. Thorne's inquiry match those displayed by William Budd in his memorable investigation of a similar outbreak in Devonshire. Dr. Budd's process was centrifugal—tracing from a single case in the village of North Lawton the ravages of the fever far and wide. Dr. Thorne's process was centripetal—tracing the epidemic backward from the multitude of cases first presented to the

single individual whose infected excreta, poured into the well at Caterham, were the cause of all.'

"Finally, my friends, the good time a-coming, announced by Tyndall twenty years ago, has arrived! The sanitary work of the quarter-century of our contention with correlation with the facts it has evoked in conjunction with collateral delvers into the foul soil it has cleansed, into the impure waters it has clarified, into the marshes it has drained, the air that it has screened from malignant organisms are the notes of its triumphant song in praise of sanitary methods. Yours truly,

"T. P. CORBALLY, M.D."

To the foregoing summary by my esteemed associate, to whom I am under lasting obligations for aid in the declared purpose of and for the results achieved by THE SANITARIAN, I have but little to add.

Contemporaneously THE SANITARIAN and "The Popular Science Monthly" (beginning just one year before THE SANITARIAN) have maintained most congenial relations, but time now calls for change of conditions.

The opposite page is self-explanatory. Sanitation has lost none of its attractiveness to the subject of the picture, by his many years devotion to the means of promoting health and longevity. Quite the contrary, indeed. But all the while Prospect Park has become more and more alluring in the recurring season of fragrant flowers and singing birds, hence he has now arranged for a rest. Has merged THE SANITARIAN with "The Popular Science Monthly," which takes up its rôle.

The retired editor, still being blessed with good sight, promises occasional contributions.

All correspondence, business communications and subscriptions *beyond those already made for* THE SANITARIAN should be addressed,

THE POPULAR SCIENCE MONTHLY,
Sub-station 84, New York City.

All subscriptions *due for* THE SANITARIAN and all personal correspondence for the undersigned should be addressed as heretofore—337 Clinton street, Brooklyn, N. Y.

A. N. BELL, M.D.

A. M. Bell M.D.
In his 82nd Year

THE NEW YORK
PUBLIC LIBRARY

ASTOR, LENOX AND
TILDEN FOUNDATIONS.

INDEX.

A Certain Naval Officer's Irritability, 549.
Accident, Record of Deaths by, in New York City, 75.
Adulteration of Food and Drugs, The, Bill for Preventing, 431.
Adulteration of Food in New Hampshire, 530.
After Death, Life—"The United Presbyterian," 546.
Alcohol Fight Succeeds in England, 257.
Alcohol Substitute, An, 226.
Alcohol, To Make, Undrinkable, 51.
American International Congress on Tuberculosis, 555.
Anæsthesia, Local, Connell, 255.
Anæsthetic, A New, 351.
Appendicitis, Gangrenous, Reynier, 46.
Appendicitis in the Army, Chauvel, 46.
Appendicitis, Suppurating, Opening into the Bladder, Fortuna, 158.
Associations, Conventions, Etc.:
American Climatological Association, 479; Conference of State and Provincial Boards of Health of North America, 128; French Congress on Climatology and Urban Hygiene, 274; International Congress on School Hygiene, 275; International Congress on Tuberculosis, 63, 85, 555; International Congress on Tuberculosis and Dr. Knopf, 163; The Maryland Tuberculosis Exposition, 385, 450.
Asthma, Pseudo, Hayem, 251.

Barlow's Disease, Triboulet, 250.
Bashore, H. B., Sanitary Relations of the Soil, 42; Thoughts on Market Hygiene, 243.
Beans versus Literature, 190.
Beer Bottles, A House of, 52.
Bell, A. N., Infectious and Contagious Diseases, 289; Our Homes and Ourselves, 3.
Bell, A. N., Consolidation of The Sanitarian with "The Popular Science Monthly," 568.
Bell, A. N., Portrait of, 568.
Bell Mettle, 64.
Bible, The, Nicholas Murray Butler, 548.
Biliary Lithiasis, Cure of, by Chologene, Gaudin, 437.
Biography of a Fool, 540.

Book Reviews:
Adirondack Cottage Sanitarium, 471; American Society for the Prevention of Cruelty to Animals, 471; American Year-Book of Medicine and Surgery (Gould), 378; Atlantic Monthly, 286, 549; Baby, The, Practical Care of (Kilmer), 185; Bacteria, Yeasts and Molds in the Home (Conn), 185; Blues, The (Abrams), 279; Children of the Tenements (Riis), 182; Climatology of California (McAdie), 380; Consumption, The Self Cure of, Without Medicine (Davis), 281; Declaration of Independence, 469; Delineator, The, 549; Diagnosis from the Eye (Lane), 543; Diseases of Metabolism and Nutrition (Von Noorden), 90; Diseases of the Ear, Nose and Throat (Kyle), 91; Diseases of the Eye (Fox), 280; Diseases of the Horse (Department of Agriculture), 91; Diseases of the Prostate Gland and Adnexa, A Non-Surgical Treatise on (Overall), 90; Disinfection and the Preservation of Food (Rideal), 276; Elements in Water Bacteriology (Prescott), 541; Foundation of All Reform, The (Carque), 543; Infant Feeding in Its Relation to Health and Disease (Fischer), 469; Infection and Immunity (Sternberg), 184; Japanese Physical Training (Hancock), 89; Manual of Hygiene and Sanitation (Egbert), 281; Manual of Materia Medica and Pharmacy (Muir), 542; Medical Library and Historical Journal Quarterly, 473; New Jersey Training School for Feeble-Minded Girls and Boys, 470; New York State Hospital for Crippled and Deformed Children, 283; New Zealand, The Story of (Parsons), 376; Oppenheimer Institute, 92; Plain Hints for Busy Mothers (Wheeler), 282; Pompous Naval Officer, 549; Post-Graduate Hospital Report, 91; Practical Hygiene for Students, Physicians and Medical Officers (Harrington), 279; Progressive Medicine, 379; Publications Received, 96, 188, 444, 473; Report of the Bureau of Animal Industry, 187; Report of the Commissioner of Education for 1902, 186, 379; Report on Fisheries and Game in Massachusetts, 543; Report of the Surgeon-General of the Public Health and Marine Hospital Service of the United States, 380; Review of Reviews, The, 548; Roentgen Ray Diagnosis and Therapy (Beck), 542; The International Medical Annual, 469; Therapeutics of Mineral Springs and Climates (Yeo), 541; Treatise on Nervous Diseases (Pearce), 377; Tuberculosis, A Handbook for the Prevention of (Church Organization Society), 282; Weather Folk-Lore and Local Weather Signs (Garriott), 379; World's Commerce and American Industries (McFarlane), 188.

Books, The Fifty Best, 478.
Brackett, E. A., To-Day, 258.
Brain-Fag, and Its Effects on Health, Knott, 108.
Bronchoscopie, La, Lemoyer, 252.

Bryce, P. H., Relative Frequency of Contagious Diseases in Children of School Age, 497.
Buried Alive—The Coroner's Office, 520.
Butter-Making in Canada, Johnson, 41.

Carburetted Air Light, Marshall, 441.
Carnegie Institution, The, 164.
Car, Pullman, a, How, is Cleaned, 62.
Catarrh, Nasal, Treatment of, Mannon, 159.
Celluloid Doll Heads, Danger in, 168.
Cephalo-Rachidian Liquid, the, Circulation of, Cathelin, 49.
Children, A New Physical Culture for, 287.
Children, Naughtiness in, 336.
Child-Saving Laws Sustained, 444.
Cholera in the Philippines, 369.
Cider and Jam in England, 302.
Circulation, The, in the Secretion of the Urine, Lamy and Mayer, 156.
City, a Great, Some Problems of, Warner, 424.
City Lots, Vacant, Utilizing, 383.
Cocaine is Not Coca, 256.
Collargolum by Intravenous Injections in Erysipelas, Coleman, 159.
Complexion, the, The Care of, 191.
Co-operative Agencies for the Extension of the Registration Area and Improvement of Vital Statistics, King, 535.
Copyright, International, 382.
Corbally, T. P., Medical Excerpt, 46, 156, 249, 348, 437.
Corbally, T. P., THE SANITARIAN—Appreciation of, 556.
Coroners, the, The Passing of, 449.
Crosby, E. H., Tolstoy's Answer to the Riddle of Life, 151.
Cynic's, The, Revised Wisdom, 339.

Dead Out of Doors, 423.
Debility, Extreme, Best Remedy for, 249.
Digestion, Gastric, Chloride of Sodium in, Linassier, 439.
Diseases, Epidemic Infectious, Controlling Influence of Environment in, McLaughlin, 294.
Diseases, Infectious and Contagious, Bell, 289.
Diseases, the Prevention of, Some Discoveries for, Smith, 239.
Disinfecting Apparatus, A New, 309.
Dog, Mad, 452.
Drunkards, Dispensaries for, Rubakoff, 441.
Drunkenness, Popular Remedies for, in Russia, Demitch, 442.
Dwarfs, Two, Brother and Sister, Poncet, 47.

Eddy, Atmospheric, An, Hallock, 201.
Eddy's, Mrs., Logic, 475.
Edinburgh and London, Street Dirt in, 167.

Education and the Elimination of Crime, 236.
Education and the World's Work of To-Day, Woodward, 97.
Energy, Conservation of, in Those of Advanced Years, 287.
Epidemics, International Prevention of, 501.
Epidemics, Prevention of, Cooper, 124.
Epileptiform Convulsions, Seat of, Samaja, 49, 249.
Examination of Candidates for United States Public Health and Marine Hospital Service, 273.
Exodin, a New Purgative, Ebstein, 254.

Female Education and the Birth Rate, "An Alumna," 544.
Fireproofing Test a Success, 448.
Fireproofing Wood, 535.
Flick, L. F., House Infection of Tuberculosis, 412.
Fog-Demon, the, Knell of, 53.
Food Inspection, Importance of, as a Sanitary Measure, Le Hardy, 113.
Function, The, of Selection, 381.

Galalith, or Milk Stone Manufactures, Hughes, 44.
Gas, Illuminating, in Public Sanitation, Lastchenkoff, 51.
Go Not Too Far, Coates, 94.
Guinea-Pig, the, Attempt to Render, Anti-Tuberculous, Levy, 48.

Hallock, C., An Atmospheric Eddy, 201.
Harris, S., Other Sources of Typhoid Infection than Through the Medium of Drinking Water, 310.
Health Inspectors, 353.
Helenin and Its Therapeutic Applications, De Korab, 349.
Helenin in Emphysema, Marey, 349.
Hoffman, F. L., The Statistical Laws of Tuberculosis, 396.
Holt, L. E., Milk, 13.
Hughes, O. J. D., Galalith, or Milk Stone Manufactures, 44.
Huret, J., Equal to the Occasion, 221.
Hurty, J. N., The Maryland Tuberculosis Exposition, 385.
Hygiene in the State of New York, 222.

India, Sanitation in, 168.
International Prevention of Epidemics, 496.
Iroquois Theater Fire, The, 175.
Isthmus, the, Sanitary Conditions of, 269.

Jefferson's Embargo, Harvey, 93.
Johnson, F. S. S., Butter Making in Canada, 41.

Kidneys, the, Measure of the Physiological Activity of, Grehant, 349.
King, W. A., Improvement of Registration of Vital Statistics, 537.

Kitchen, the, Of Interest in, 384.
Knott, J., Brain Fag, and Its Effects on Health, 108.

La Grippe, The Cough Sequela of, McCarty, 256.
Le Hardy, J. C., A Reminiscence of Yellow Fever, 113; Importance of Food Inspection as a Sanitary Measure, 113.
Life and Limb, To Save, 61.
Life, Waste of, in the State of New York, by Parsimony, 455.
Living, The Joy of, French, 93.
London, Health of, 271.
Long Island, The Climate of, Ross, 193.

"Maple Syrup," 530.
McLaughlin, J. W., Controlling Influence of Environment in Epidemic Infectious Diseases, 294.
Market Hygiene, Thoughts on, Bashore, 243.
Marmoreck, Le Serum de, Dieulafoy, 158.
Mazatlan, Sewerage and Drainage of, 467.
Medical Excerpt, Corbally, 46, 156, 249, 348, 437.
Memorial Hospital, Richmond, Va., 92.
Methods and Interpretation of Water Analysis, A. Robin, 481.
Milk, Purification of, by Ozonization, 352.
Milk—Report upon the Results of the Different Kinds of Pure and Impure Milk in Infant Feeding in Tenement Houses and Institutions of New York City, Holt and Park, 13.
Mood, the, Changed, 322.
Mortality and Morbidity Reports and Reviews, 65, 170, 258, 358, 453, 520.
Mosquitoes, Warfare on, 60.
Mount Sinai Hospital, The New, a Model of Sanitary Science, 356.

Navy Medical Corps, the, Changes in the Personnel of, 70.
Navy, the, Health of, 65.
Nephritis, Chronic, Dietetic Treatment of, Vaughn, 215.
Neurasthenia, Rankin, 507.
New York City's New Health Commissioner, Dr. Thomas Darlington, 171.
New York City's Streets, Problem of Keeping, Clean, Woodbury, 140.
New York City, Vital Statistics of, 1903, 360.
New York at World's Fair, 479.
New York, the State of, Hygiene in, 222.

OBITUARY:
Julia Ann (Hamlin) Bell, 258.
Cyrus Edson, M.D., 260.
Robert Wood Mitchell, M.D., 84.
Moreau Morris, M.D., 358.
Thompson, Sir Henry, Bart., 520.

Occasion, the, Equal to, Huret, 221.
Oppenheimer Institute, Annual Meeting, 272.
"Orange Blossom Honey," 530.
Osler, W., The Home in Its Relation to the Tuberculosis Problem, 323.
Our Homes and Ourselves, Bell, 3.

Panama Canal—Problem of Sanitation, 474.
Panama, Isthmus of, the, Sanitary Conditions and Diseases Common to, Shiffert, 120.
Park, W. H., Milk, 13.
Parsifal, 94.
Patents, Sanitary, Recent, 56, 161, 375, 443.
PERSONAL:
Thomas Darlington, M.D., 171.
W. O. B. Wingate, M.D., 373.
Physical Ideal, the, Steps in Attaining, Frazee, 146.
Plague, Bubonic, in Peru and Mauritius, 466.
Plague Prevention by Vaccination, 169.
Pneumonia, Prevention of, 245.
Poisoning of English Beer and Food, United States Consul Smyth, 515.
Potato, the, The Use of, 52.
Pregnancy, Density of the Blood During the Last Months of, Bar, 440.
Preparing Clams for Food Purposes, Richard Guenther, 514.
Preservatives, Alleged Injurious Effects of, in American Meats and Dried Fruits in Germany, Hanauer, 308.
Proctor's Theaters, 95, 192, 288, 384, 550.

Radio-Active Substances, The Continuous Emission of Light and Heat by, 476.
Radiographies of the Tubercular Ganglions, Bouchard, 156.
Radiotherapy, Epithelioma Cured by, Huret, 348.
Rankin, Gunther, M.D., Wear and Tear of Life—Neurasthenia, 592.
Relative Prevalence of Contagious Diseases in Children of School Age, P. H. Bryce, 497.
Remittent Fever in India Caused by a New Piroplasme, 159.
Removed the Germs, 534.
Robin, A., M.D., Methods and Interpretation of Water Analysis, 481.
Roentgen Rays, Action of, on Animal Tissues, Lepine, 348.
Ross, W. H., The Climate of Long Island, 193.

Salicylic Acid Harmful, 169.
San Francisco's New Board of Health, 361.
SANITARIAN, THE, Appreciation of, T. P. Corbally, 556.

SANITARIAN, THE, Delay and Deficiency of the March Issue, 258.
SANITARIAN, THE, Merged with The Popular Science Monthly, 568.
Sanitary Baking Houses, 534.
Sanitary Laws, Texas, 246.
Sanitation of India, 168.
Scab? What is a, 191.
Schmid, H. E., School Hygiene and the Need of Medical Supervision in All Our Schools, 227.
School Hygiene and the Need of Medical Supervision in All Our Schools, 227.
Servetus, Monument to, 64.
Sewage, Distribution of, on Bacteria Beds, 54.
Sewerage and Drainage of Mazatlan, 467.
Shiffert, H. O., Sanitary Conditions and Diseases Common to the Isthmus of Panama, 120.
Ship, An Unsinkable, 165.
Ship, Why is a, Called "She"? 64.
Sinus, Frontal, the, Suppuration in, Luc, 251.
Smith, W. R., Some Discoveries for the Prevention of Disease, 239.
Smyth, United States Consul, Poisoning of English Beer and Foods, 515.
Soap, 447.
Soil, the, Sanitary Relations of, Bashore, 42.
Soul, The, Electricity Transformed, 477.
Spitting Nuisance, The, 354.
Studying Yellow Fever in South America, 534.
Success, 55.
Suicide, 467.
Superuncontradistinguishabilitiveness, 550.

Telling Fortunes, 45.
Tenderloin, the, Real Life Drama in, 446.
Tenement-House Enlargements in Boston, 166.
Tenement Houses, New York City, Commissioner's Report, 58.
Tetanus, Sub-Acute, Blin, 50.
Texas Sanitary Law, 246.
Theater Fires, 340.
Tibbles, W., Prevention of Tuberculosis, 202.
Timepieces, The Old, and How to Care for Them, 436.
To-Day, Brackett, 258.
Tolstoy's Answer to the Riddle of Life, Crosby, 151.
Trail, the, Trouble on, 189.
Truss Frame, The Pomeroy, 256.
Tuberculines, Marmoreck, 156.
Tuberculosis, Carbonic Acid Treatment of, Weber, 351.
Tuberculosis, Curability of, Vaughn, 352.
Tuberculosis, Decrease of Mortality from, in Germany, 467.
Tuberculosis Exposition, The Maryland, Hurty, 385.

Tuberculosis Hospital to be Built Among the Pines, 450.
Tuberculosis, House Infection of, Flick, 412.
Tuberculosis in England, 270.
Tuberculosis, Prevention of, Tibbles, 202.
Tuberculosis Problem, the, The Home in Its Relation to, Osler, 323.
Tuberculosis Seaside Plan, 355.
Tuberculosis, The Statistical Laws of, Hoffman, 396.
Tuberculosis, To Fight, 355.
Typhoid Fever, Committee on, 264.
Typhoid Fever Epidemic, The, in Butler, Pa., 82.
Typhoid Infection, Other Sources of, than Through the Medium of Drinking Water, Harris, 310.
Typhoid Record, Unenviable, Pittsburg's, 267.

Universal Exposition at St. Louis—Section on Hygiene, 551.
Unrest, Brackett, 347.
Urotropin in the Prophylaxis of Scarlatinal Nephritis, Widowitz, 160.

Vaccination Law Upheld, 61.
Vaudeville, 478.
Virginia Hot Springs, Dr. Guy Hinsdale, Medical Advisor, 170.

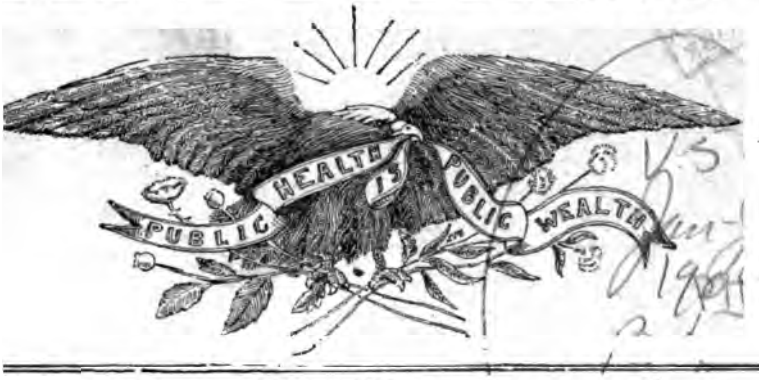
Warner, B., Some Problems of a Great City, 424.
Water, Drinking, in the Army, Vallin, 50.
Water, Purifying, with Ozone, 53.
Water Supplies, Illinois, 263.
Water Supplies, Protection of, Cartwright, 303.
Water Supply, Additional, for the City of New York, 135.
Wear and Tear of Life—Neurasthenia, Rankin, 502.
Wind-Call, A, Tabb, 383.
Women, New Vocation for, 168.
Women Pioneers, Great, 477.
Women, Successful, of America, Northrop, 189.
Woodbury, J. McG., Problem of Keeping New York City's Streets Clean, 140.
Woodward, R. S., Education and the World's Work To-day, 97.
Wound of the Liver and Right Femoral Artery, Leguen, 158.
Wounds, Sluggish, Healing, Bleck, 250.

Yellow Fever, A Reminiscence of, Le Hardy, 113.

Tuberculosis Hospital to be Built Among the Pines, 450.
Tuberculosis, House Infection of, Flick, 412.
Tuberculosis in England, 270.
Tuberculosis, Prevention of, Tibbles, 202.
Tuberculosis Problem, the, The Home in Its Relation to, Osler, 323.
Tuberculosis Seaside Plan, 355.
Tuberculosis, The Statistical Laws of, Hoffman, 396.
Tuberculosis, To Fight, 355.
Typhoid Fever, Committee on, 264.
Typhoid Fever Epidemic, The, in Butler, Pa., 82.
Typhoid Infection, Other Sources of, than Through the Medium of Drinking Water, Harris, 310.
Typhoid Record, Unenviable, Pittsburg's, 267.

2937.41

THE SANITARIAN



l. lii. JANUARY. 1904 No. 410.

ELL, A.M., M.D., Editor. T. P. CORBALLY, A.M., M.D., HARRY KENT BELL, M.D., Associate Editors.

COLLABORATORS:

KER, M.D., Sec. S. Bd. of H., Mich.
SHORE, M.D., Insp. S. Bd. of H., Pa.
N. BELL, C. E., N. Y.
RGESS, M.D., N. Y.
M. H. BREWER, Ph.D., Sheffield Scientific School, Yale University, Ct.
E. CHAILLE, A.M., M.D., La.
ANCELLOR, M.D., Md.
GIN, M.D., Miss.
ALMON, D.V.M., D.C.
RNSEY, ESQ., of the New York Bar.
SEPH HOLT, M.D., Louisiana.
HARDY, M.D., Georgia.
LTON, A.M., M.D., Sec. S. Bd. of H., Va.
SCOLN, M.D., N. Y.

ANDREW MACPHAIL, B.A., M.D., M.R.C.S., Eng., L.R.C.P., Lond., Montreal.
J. N. MCCORMACK, M.D., Sec. S. Bd. of H., Ky.
MORTAU MORRIS, M.D., N. Y.
WOLFRED NELSON, C.M., M.D., F.R.G.S., N. Y.
C. O. PROBST, M.D., Sec. O. S. Bd. of H.; Sec. Am. Pub. Health Association, O.
MRS. H. M. PLUNKETT, Pittsfield, Mass.
CHARLES SMART, M.D., Lt.-Col. and Assistant Surgeon General, U. S. A.
PROF. STEPHEN SMITH, M.D., L.L.D., N. Y.
H. R. STORER, A.M., M.D., R. I.
A. WALTER SUTER, A.M., M.D., N. Y.
P. S. WAITES, A.M., M.D., Med. Dir. U. S. N.
J. A. WILSON, A.M., M.D., Sec. N. H. S. Bd. of H.

THE SANITARIAN IS AS OTHERS SEE IT:

A. N. BELL, M.D., 237 Clinton St., Brooklyn, N. Y.

BOUND VOLUMES For prices in detail see another page

AT GREATLY REDUCED PRICES

at the Post-Office at New York, N. Y., as second class matter.

THE Sanitarian

PARIS, 41 Bd. Haussmann.
LONDON, 229 Oxford St.

MARIANI & CO.,

52 West 15th Street, NEW YORK.

Philadelphia, 841 North Broad Stre
Pittsburgh, 110 W. North Ave., Alleghe
Detroit, Mich., 25 Piquette Aven
Atlantic City, N. J., 2901 Pacific Aven
Waterbury, Conn., 58 Center Stre
Saratoga Springs, N. Y., 485 Broadw

Institutes for the treatment of al
holic and drug diseases have be
established at the above address
Send your patients to the nearest
stitute. For printed matter and ge
eral information write to the exec
tive offices of the Oppenheimer
stitute, 170 Broadway, New Yo

THE SANITARIAN

Vol. lii. MARCH, 1904. No. 412.

A. N. BELL, A.M., M.D., Editor. T. P. CORBALLY, A.M., M.D., HARRY KENT BELL, M.D., Associate Editors.

COLLABORATORS:

H. B. BAKER, M.D., Sec. S. Bd. of H., Mich.
H. B. BASHORE, M.D., Insp. S. Bd. of H., Pa.
GEORGE N. BELL, C.E., N. Y.
D. M. BURGESS, M.D., N. Y.
PROF. WM. H. BREWER, Ph.D., Sheffield Scientific School, Yale University, Ct.
PROF. S. E. CHAILLE, A.M., M.D., La.
C. W. CHANCELLOR, M.D., Md.
S. H. DURGIN, M.D., Mass.
D. E. SALMON, D.V.M., D.C.
R. S. GUERNSEY, Esq., of the New York Bar.
PROF. JOSEPH HOLT, M.D., Louisiana.
J. C. LE HARDY, M.D., Georgia.
H. D. HOLTON, A.M., M.D., Sec. S. Bd. of H., Vt.
D. F. LINCOLN, M.D., N. Y.
ANDREW MACPHAIL, B.A., M.D., M.R.C.S., Eng., L.R.C.P., Lond., Montreal.
J. N. MCCORMACK, M.D., Sec. S. Bd. of H., Ky.
MORTAU MORRIS, M.D., N. Y.
WOLFRED NELSON, C.M., M.D., F.R.G.S., N. Y.
C. O. PROBST, M.D., Sec. O. S. Bd. of H.; Sec. Am. Pub. Health Association, O.
MRS. H. M. PLUNKETT, Pittsfield, Mass.
CHARLES SMART, M.D., Lt.-Col. and Assistant Surgeon General, U. S. A.
PROF. STEPHEN SMITH, M.D., L.L.D., N. Y.
H. R. STORER, A.M., M.D., R.I.
A. WALTER SUTTLE, A.M., M.D., N. Y.
P. S. WALES, A.M., M.D., Med. Dir. U. S. N.
I. A. WATSON, A.M., M.D., Sec. N. H. S. Bd. of H.

"THE SANITARIAN IS" AS OTHERS SEE IT: "THE AMERICAN AUTHORITY for everything appertaining to the health and well-being of the people at large," (*Virginia Medical Monthly*) "Medical and sanitary matters pertaining to military questions and conditions of tropical life are handled much more ably and promptly than all others, as is the case with Dr. A. N. Bell in such matters." (*The Southern Medical Journal*) "The leading sanitary publication in America," (*Mississippi Valley Medical Monthly*) "The best American publication devoted to Hygiene." (*Herald*.)

THE SANITARIAN is published in Brooklyn, New York; $4.00 a year in advance; 35 cents a number. SAMPLE COPIES, 20 cents. Foreign Postage, 50 cents. Postage Stamps.

☞All subscriptions, Foreign Editions, all exchanges with THE SANITARIAN, and all publications for review, should be addressed to the Editor—

A. N. BELL, M.D., 337 Clinton St., Brooklyn, N. Y.

BOUND VOLUMES For prices in detail see another page
AT GREATLY REDUCED PRICES

Entered at the Post-Office at Brooklyn, N. Y., May 1st, 1880, as second class of

THE SANITARIAN,

A MONTHLY MAGAZINE.

1873—1904.

THE PURPOSE OF THIS PUBLICATION is to so present the results of the various inquiries which have been, and which may hereafter be made for the preservation of health and the expectations of human life, as to make them most advantageous to the public and to the medical profession.

The resources of sanitary science are inexhaustible. It will be a chief object of the SANITARIAN to awaken public attention to the extent of the field, and to the facts indicating how beneficently it may be cultivated. This will be done by showing the amount of ill-health and mortality from preventable causes of disease; by pointing out the nature of those causes and the way in which they operate; by showing that such causes are removable, and by exhibiting improved health, longevity and happiness as the fruits of their removal.

The laws of physiology and general pathology will be kept in view, as the basis of health; by the observance of which, hygiene constitutes a department of science which the medical profession can advantageously share with the public, or apply to individuals according to circumstances. The detail of these relations will involve questions of manifold significance, and many of them of the utmost importance to human health.

The practical questions of State Medicine: the health of armies and navies, marine hygiene, quarantine, civic cleanliness, water supply, drainage and sewerage. Sanitary architecture: light, space, warming and ventilation. Climate and domicile: endemic, epidemic and hereditary diseases. Occupation, exercise and habits; food and beverages, in all varieties of quality and quantity. In short, whatever thing, condition or circumstance is in rapport with, or antagonistic to, the perfective culture of mind and body will be considered legitimate matter for the SANITARIAN to discuss, advocate, condemn or reject as the *bar of health*. Advertisements will fall under the same category, none will be admitted of questionable character in this regard.

In fulfilment of its mission, the SANITARIAN asks kindly consideration and assistance from all who would aid in the protection of the most precious of gifts divine—*human life*."—1873.

"As the SANITARIAN has been hitherto, it will continue to be in the future. Devoted to the promotion of the art and and science of sanitation, mentally and physically, in all their relations: by the investigation, presentation and discussion of all subjects in this large domain, as related to personal and household hygiene, soil and climate, food and drink, habit and exercise, occupations, vital statistics, sanitary organizations and laws, everything promotive of or in conflict with health, with the purpose of rendering sanitation a popular theme of study and universally practical.

"The Editor, Dr. A. N. Bell, is well known to the mercantile community for his co-operation with the merchants in quarantine reform, and to his profession as a leader in sanitary science."—*N. Y. Journal of Commerce*.

"It is the best sanitary publication in America."—*Mississippi Valley Medical Monthly*.

The SANITARIAN will continue in its present form, 96 pages *text*, monthly; *two* volumes yearly. The volumes begin January and July. Subscriptions at any time.

TERMS:—$4.00 a year, in advance; 35 cents a number; sample copies, 20 cents—ten two-cent postage stamps

☞ *All* correspondence and exchanges with the SANITARIAN, and all publications for review should be addressed to the Editor,

DR. A. N. BELL,

337 Clinton St., Brooklyn, N. Y.

THE GRAB. R. FRIBLEY COMPANY, PRINTERS.

THE SANITARIAN

Vol. lii. APRIL, 1904. No. 413.

A. N. BELL, A.M., M.D., Editor. T. P. CORBALLY, A.M., M.D., HARRY KENT BELL, M.D., Associate Editors.

COLLABORATORS:

H. B. BAKER, M.D., Sec. S. Bd. of H., Mich.
H. B. BASHORE, M.D., Insp. S. Bd. of H., Pa.
GEORGE N. BELL, C. E., N. Y.
D. M. BURGESS, M.D., N. Y.
PROF. WM. H. BREWER, Ph.D., Sheffield Scientific School, Yale University, Ct.
PROF. S. E. CHAILLE, A.M., M.D., La.
C. W. CHANCELLOR, M.D., Md.
S. H. DURGIN, M.D., Mass.
D. E. SALMON, D.V.M., D.C.
E. S. GUERNSEY, ESQ., of the New York Bar.
PROF. JOSEPH HOLT, M.D., Louisiana.
J. C. LE HARDY, M.D., Georgia.
H. D. HOLTON, A.M., M.D., Sec. S. Bd. of H., Vt.
D. F. LINCOLN, M.D., N. Y.
ANDREW MACPHAIL, B.A., M.D., M.R.C.S., Eng., L.R.C.P., Lond., Montreal.
J. N. MCCORMACK, M.D., Sec. S. Bd. of H., Ky.
MOREAU MORRIS, M.D., N. Y.
WOLFRED NELSON, C.M., M.D., F.R.G.S., N. Y.
C. O. PROBST, M.D., Sec. O. S. Bd. of H.; Sec. Am. Pub. Health Association, O.
MRS. H. M. PLUNKETT, Pittsfield, Mass.
CHARLES SMART, M.D., Lt.-Col. and Assistant Surgeon General, U. S. A.
PROF. STEPHEN SMITH, M.D., L.L.D., N. Y.
H. R. STORER, A.M., M.D., R. I.
A. WALTER SUITER, A.M., M.D., N. Y.
P. S. WALES, A.M., M.D., Med. Dir. U. S. N.
I. A. WATSON, A.M., M.D., Sec. N. H. S. Bd. of H.

"THE SANITARIAN IS" AS OTHERS SEE IT: "THE AMERICAN AUTHORITY for everything appertaining to the healthful condition of the people at large," (*Virginia Chronicle*). "It deals with everything pertaining to sanitary questions and conditions of to-day. In its field it stands pre-eminently ahead of all others, as does its editor, Dr. A. N. Bell, in sanitary matters." (*The Southern Medical Journal*) "The best sanitary publication in America," (*Mississippi Valley Medical Monthly.*) "The best American publication devoted to Hygiene." (*Herald.*)

THE SANITARIAN is published in Brooklyn, New York; $4.00 a year in advance; 35 cents a number. SAMPLE COPIES, 20 cents—ten two-cent Postage Stamps.

☞All subscriptions and correspondence; all exchanges with THE SANITARIAN, and all publications for review, should be addressed to the Editor—

A. N. BELL, M.D., 337 Clinton St., Brooklyn, N. Y.

BOUND VOLUMES For prices in detail see another page.
AT GREATLY REDUCED PRICES

Entered at the Post-Office at Brooklyn, N. Y., Mar. 17, 1900, as second class of

THE SANITARIAN,

A MONTHLY MAGAZINE.

1873—1904.

THE PURPOSE OF THIS PUBLICATION is to so present the results of the various inquiries which have been, and which may hereafter be made for the preservation of health and the expectations of human life, as to make them most advantageous to the public and to the medical profession.

The resources of sanitary science are inexhaustible. It will be a chief object of the SANITARIAN to awaken public attention to the extent of the field, and to the facts indicating how beneficently it may be cultivated. This will be done by showing the amount of ill-health and mortality from preventable causes of disease; by pointing out the nature of those causes and the way in which they operate; by showing that such causes are removable, and by exhibiting improved health, longevity and happiness as the fruits of their removal.

The laws of physiology and general pathology will be kept in view, as the basis of health; by the observance of which, hygiene constitutes a department of science which the medical profession can advantageously share with the public, or apply to individuals according to circumstances. The detail of these relations will involve questions of manifold significance, and many of them of the utmost importance to human health.

The practical questions of State Medicine: the health of armies and navies, marine hygiene, quarantine, civic cleanliness, water supply, drainage and sewerage. Sanitary architecture: light, space, warming and ventilation. Climate and domicile: endemic, epidemic and hereditary diseases. Occupation, exercise and habits; food and beverages, in all varieties of quality and quantity. In short, whatever thing, condition or circumstance is in rapport with, or antagonistic to, the perfective culture of mind and body will be considered legitimate matter for the SANITARIAN to discuss, advocate, condemn or reject at the *bar of health*. Advertisements will fall under the same category, none will be admitted of questionable character in this regard.

In fulfilment of its mission, the SANITARIAN asks kindly consideration and assistance from all who would aid in the protection of the most precious of gifts divine—*human life*."—1873.

"As the SANITARIAN has been hitherto, it will continue to be in the future. Devoted to the promotion of the art and and science of sanitation, mentally and physically, in all their relations: by the investigation, presentation and discussion of all subjects in this large domain, as related to personal and household hygiene, soil and climate, food and drink, habit and exercise, occupations, vital statistics, sanitary organizations and laws, everything promotive of or in conflict with health, with the purpose of rendering sanitation a popular theme of study and universally practical.

"The Editor, Dr. A. N. Bell, is well known to the mercantile community for his co-operation with the merchants in quarantine reform, and to his profession as a leader in sanitary science."—*N. Y. Journal of Commerce*.

"It is the best sanitary publication in America."—*Mississippi Valley Medical Monthly*.

The SANITARIAN will continue in its present form, 96 pages *text*, monthly; *two* volumes yearly. The volumes begin January and July. Subscriptions at any time.

TERMS:—$4.00 a year, in advance; 35 cents a number; sample copies, 20 cents—ten two-cent postage stamps

☞ *All* correspondence and exchanges with the SANITARIAN, and all publications for review should be addressed to the Editor,

DR. A. N. BELL,

337 Clinton St., Brooklyn, N. Y.

MAY 13 04

THE SANITARIAN

Vol. lii. MAY, 1904. No. 414.

A. N. BELL, A.M., M.D., Editor. T. P. CORBALLY, A.M., M.D., HARRY KENT BELL, M.D., } Associate Editors.

COLLABORATORS:

H. B. BAKER, M.D., Sec. S. Bd. of H., Mich.
H. B. BASHORE, M.D., Insp. S. Bd. of H., Pa.
GEORGE N. BELL, C.E., N. Y.
D. M. BURGESS, M.D., N. Y.
PROF. WM. H. BREWER, Ph.D., Sheffield Scientific School, Yale University, Ct.
PROF. S. E. CHAILLE, A.M., M.D., La.
C. W. CHANCELLOR, M.D., Md.
S. H. DURGIN, M.D., Mass.
D. E. SALMON, D.V.M., D.C.
R. S. GUERNSEY, ESQ., of the New York Bar.
PROF. JOSEPH HOLT, M.D., Louisiana.
J. C. LE HARDY, M.D., Georgia.
H. D. HOLTON, A.M., M.D., Sec. S. Bd. of H., Vt.
D. F. LINCOLN, M.D., N. Y.
ANDREW MACPHAIL, B.A., M.D., M.R.C.S., Eng., L.R.C.P., Lond., Montreal.
J. N. MCCORMACK, M.D., Sec. S. Bd. of H., Ky.
MOREAU MORRIS, M.D., N. Y.
WOLFRED NELSON, C.M., M.D., F.R.G.S., N. Y.
C. O. PROBST, M.D., Sec. O. S. Bd. of H.; Sec. Am. Pub. Health Association, O.
MRS. H. M. PLUNKETT, Pittsfield, Mass.
CHARLES SMART, M.D., Lt.-Col. and Assistant Surgeon General, U. S. A.
PROF. STEPHEN SMITH, M.D., L.L.D., N. Y.
H. R. STORER, A.M., M.D., R. I.
A. WALTER SUITER, A.M., M.D., N. Y.
P. S. WALES, A.M., M.D., Med. Dir. U. S. N.
I. A. WATSON, A.M., M.D., Sec. N. H. S. Bd. of H.

"THE SANITARIAN IS" AS OTHERS SEE IT: "THE AMERICAN AUTHORITY for everything appertaining to the healthful condition of the people at large," (*Virginia Chronicle*). "It deals with everything pertaining to sanitary questions and conditions of to-day. In its field it stands pre-eminently ahead of all others, as does its editor, Dr. A. N. Bell, in sanitary matters." (*The Southern Medical Journal*). "The best sanitary publication in America," (*Mississippi Valley Medical Monthly*). "The best American publication devoted to Hygiene." (*Herald.*)

THE SANITARIAN is published in Brooklyn, New York; $4.00 a year in advance; 35 cents a number. SAMPLE COPIES, 20 cents—ten two-cent Postage Stamps.

☞All subscriptions and correspondence; all exchanges with THE SANITARIAN, and all publications for review, should be addressed to the Editor—

A. N. BELL, M.D., 337 Clinton St., Brooklyn, N. Y.

BOUND VOLUMES

AT GREATLY REDUCED PRICES

For prices in detail see another page

Entered at the Post-office a Brooklyn, N. Y., Mar. 17, 1900, as second class of mail matter, under the Act of Mar. 3, 1879.

THE SANITARIAN.

A MONTHLY MAGAZINE.

1873—1904.

THE PURPOSE OF THIS PUBLICATION is to so present the results of the various inquiries which have been, and which may hereafter be made for the preservation of health and the expectations of human life, as to make them most advantageous to the public and to the medical profession.

The resources of sanitary science are inexhaustible. It will be a chief object of the SANITARIAN to awaken public attention to the extent of the field, and to the facts indicating how beneficently it may be cultivated. This will be done by showing the amount of ill-health and mortality from preventable causes of disease; by pointing out the nature of those causes and the way in which they operate; by showing that such causes are removable, and by exhibiting improved health, longevity and happiness as the fruits of their removal.

The laws of physiology and general pathology will be kept in view, as the basis of health; by the observance of which, hygiene constitutes a department of science which the medical profession can advantageously share with the public, or apply to individuals according to circumstances. The detail of these relations will involve questions of manifold significance, and many of them of the utmost importance to human health.

The practical questions of State Medicine: the health of armies and navies, marine hygiene, quarantine, civic cleanliness, water supply, drainage and sewerage. Sanitary architecture; light, space, warming and ventilation. Climate and domicile; endemic, epidemic and hereditary diseases. Occupation, exercise and habits; food and beverages, in all varieties of quality and quantity. In short, whatever thing, condition or circumstance is in rapport with, or antagonistic to, the perfective culture of mind and body will be considered legitimate matter for the SANITARIAN to discuss, advocate, condemn or reject at the *bar of health*. Advertisements will fall under the same category, none will be admitted of questionable character in this regard.

In fulfilment of its mission, the SANITARIAN asks kindly consideration and assistance from all who would aid in the protection of the most precious of gifts divine—*human life*."—1873.

As the SANITARIAN has been hitherto, it will continue to be in the future. Devoted to the promotion of the art and and science of sanitation, mentally and physically, in all their relations; by the investigation, presentation and discussion of all subjects in this large domain, as related to personal and household hygiene, soil and climate, food and drink, habit and exercise, occupations, vital statistics, sanitary organizations and laws, everything promotive of or in conflict with health, with the purpose of rendering sanitation a popular theme of study and universally practical.

"The Editor, Dr. A. N. Bell, is well known to the mercantile community for his co-operation with the merchants in quarantine reform, and to his profession as a leader in sanitary science."—*N. Y. Journal of Commerce*

"It is the best sanitary publication in America."—*Mississippi Valley Medical Monthly.*

The SANITARIAN will continue in its present form, 96 pages *text*, monthly; *two* volumes yearly. The volumes begin January and July. Subscriptions at any time.

TERMS:—$4.00 a year, in advance; 35 cents a number; sample copies, 20 cents—ten two-cent postage stamps.

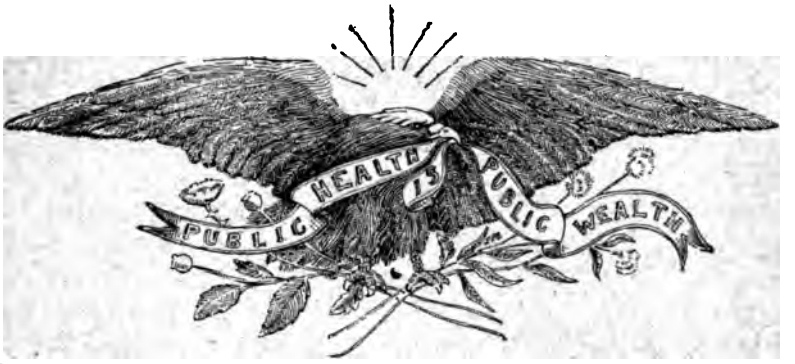
☞ *All* correspondence and exchanges with the SANITARIAN, and all publications for review should be addressed to the Editor,

DR. A. N. BELL,

337 Clinton St., Brooklyn, N. Y.

JUNE 1904

THE SANITARIAN



Vol. lii. JUNE, 1904. No. 415.

A. N. BELL, A.M., M.D., Editor. T. P. CORBALLY, A.M., M.D., HARRY KENT BELL, M.D., Associate Editors.

WITH THIS ISSUE

THE SANITARIAN per se CEASES.

Beginning with the July Issue It is Consolidated with

The Popular Science Monthly.

SUB-STATION 84, NEW YORK CITY.

Correspondence, Business and Otherwise, Should Be Addressed Accordingly.

—

Subscriptions due for the current year, orders for bound volumes and unbound stock should be addressed to DR. A. N. BELL, 337 Clinton Street, Brooklyn, N. Y.

BOUND VOLUMES
AT GREATLY REDUCED PRICES

For prices in detail see third page of cover.

Entered at the Post Office at Brooklyn, N. Y., Mar. 17, 1900, as second class of ma

Five-Grain Antikamnia Tablets
Laxative Antikamnia & Quinine Tablets

| AK |

Antikamnia & Codeine Tablets
Antikamnia & Heroin Tablets

WHEELER'S TISSUE PHOSPHATES.

WHEELER'S COMPOUND ELIXIR OF PHOSPHATES AND CALISAYA. A Nerve Food and Nutritive Tonic for the treatment of Consumption, Bronchitis, Scrofula, and all forms of Nervous Debility. This elegant preparation combines in an agreeable Aromatic Cordial *acceptable to the most irritable conditions of the stomach*, Bone Calcium Phosphate $Ca_3 2PO_4$, Sodium Phosphate $Na_2 HPO_4$, Ferrous Phosphate $Fe_3 2PO_4$, Trihydrogen Phosphate $H_3 PO_4$, and the active principles of calisaya and wild cherry.

The special indication of this combination of phosphates in spinal affections, caries, necrosis, ununited fractures, marasmus, poorly developed children, retarded dentition, alcohol, opium tolerance habits, gestation and lactation to promote development, etc., and as a PHYSIOLOGICAL RESTORATIVE in nervous debility and all used-up conditions of the nervous system, should receive the careful attention of good therapeutists.

NOTABLE PROPERTIES. As reliable in dyspepsia as quinine in ague. Secures the largest percentage of benefit in consumption and all wasting diseases, *by determining the perfect digestion and assimilation of food*. When using it Cod Liver Oil may be taken without repugnance. It renders success possible in treating chronic diseases of women and children, who take it with pleasure for prolonged periods, a factor essential to maintain the good will of the patient. Being a tisane constructive, it is the best *general utility* compound for tonic restorative purposes we have, as mischievous effects resulting from exhibiting it in any possible morbid condition of the system.

Phosphates being a NATURAL FOOD PRODUCT no substitute will do their work.

Dose.—For adults, one tablespoonful three times a day, after eating; from seven to twelve years of age, one dessertspoonful; from two to seven, one teaspoonful; for infants, from five to twenty drops according to age.

Prepared at the Chemical Laboratory of T. B. WHEELER, M.D., Montreal, P. Q.

To prevent substitution, put up in pound bottles only, and sold by all druggists at One Dollar.

Read the pamphlet on this subject sent free.

Methods and Interpretation of Water Analysis. A. Robin, M.D..... 481
International Prevention of Epidemics..... 496
Relative Prevalence of Contagious Diseases in Children of School Age. R. H. Bryce, M.D..... 497
The Wear and Tear of Life—Neurasthenia. Guthrie Rankin, M.D., M.R.C.P. 502
Preparing Clams for Food Purposes. Richard Guenther, Consul-General. 514
Poisoning of English Beer and Food. W. P. Smyth, U. S. Consul... 515

Editor's Table.

Buried Alive—The Coroner's Office; Mortality and Morbidity Reports and Reviews; Death of Sir Henry Thompson..... 520
Adulteration of Foods in New Hampshire..... 530
Studying Yellow Fever in South America; Removed the Germs; Sanitary Bakehouses in London..... 534
Fireproofing Wood; Co-operative Agencies for the Extension of the Registration Area and Improvement of Vital Statistics in the United States. Wm. A. King, Chief Statistician for Vital Statistics 535
Biography of a Fool..... 540

Book Reviews.

Elements of Water Bacteriology, with Special Reference to Sanitary Water Analysis; Prescott. Therapeutics of Mineral Springs and Climates; Burney Yeo. Roentgen Ray Diagnosis and Therapy; Carl Beck. Manual of Materia Medica and Pharmacy; Muir. Diagnosis from the Eye; Lane. The Foundation of All Reform—The Diet Question; Carqué. Report State Commission of Massachusetts on Fisheries and Game.....541-543
Publications Received..... 544

Contemporary Literature.

Female Education and the Birth Rate; from "Alumna's Children, by an Alumna"—"The Popular Science Monthly." After Death, Life; "The United Presbyterian." The Bible; Nicholas Murray Butler —"Review of Reviews" for May. The May "Atlantic." June "Delineator." A Pompous Naval Officer. Superuncontradistinguishabilitiveness. 544-549
Proctor's Theaters—Safety and Comfort..... 550
Universal Exposition at St. Louis—Department of Social Economy—Section of Hygiene..... 551
American International Congress on Tuberculosis..... 555
THE SANITARIAN—Appreciation. T. P. Corbally, M.D..... 556
CONSOLIDATED WITH THE POPULAR SCIENCE MONTHLY. A. N. Bell.. 568
Portrait of A. N. Bell..... 568
Index. .....

For Every Form of Nervous and Chronic Disease.

THE MOST COMPLETE ELECTRO-MEDICAL EQUIPMENT IN THE WORLD

Every kind and grade of Electricity known to Science, that is practically useful as a remedial agent. Thorough and intelligent adaptation to each individual case. Send for illustrated pamphlet.

BROOKLYN TURKISH BATH CO

32 AND 34 CLINTON STREET, BROOKLYN, N. Y.

DR. D. A. HARRISON,

PRIVATE HOSPITAL FOR MENTAL AND NERVOUS DISEASES,

Whitestone, L. I., New York City.

Telephone 46f-Flushing.

Brooklyn Office: 31 Sidney Place, 2 to 4 P. M.
New York Office: Mondays, Wednesdays, Fridays, 11 to 12.30. and by appointment.

SOUTHERN PINES SANITARIUM,

For the Treatment of Tuberculosis.

The oldest, largest, and most thoroughly equipped institution in Eastern North Carolina. Write for illustrated booklet.

EDWIN GLADMON, M. D., Prop.,

Southern Pines, N. C.

Greenmont-on-Hudson,

FOR MENTAL AND NERVOUS DISEASES.

Ralph Lyman Parsons, M.D.,
Ralph Wait Parsons, M.D.,
Sing Sing P. O., N. Y.

CITY OFFICE: 21 East 44th Street, New York.

Mondays and Fridays from 3.30 to 4.30 P. M.

DR. BROUGHTON'S SANITARIUM

FOR THE CARE OF

OPIUM AND OTHER DRUG ADDICTI(

Including Alcohol and Special Nervous Cas

Information furnished physicians upon applica
Address R. Broughton, M. D., Rockford,

---

50 YEARS' EXPERIENCE

PATENTS

TRADE MARKS
DESIGNS
COPYRIGHTS &C.

Anyone sending a sketch and description ma quickly ascertain our opinion free whether a invention is probably patentable. Communica tions strictly confidential. Handbook on Patent sent free. Oldest agency for securing patents.

Patents taken through Munn & Co. receiv *special notice*, without charge, in the

Scientific American.

A handsomely illustrated weekly. Largest ci culation of any scientific journal. Terms, $3 year; four months, $1. Sold by all newsdealer

MUNN & Co. 361 Broadway, **New Yor**

Branch Office, 625 F St., Washington, D. C

---

10 Cents per Copy — $1.00 per Year

The Open Court

An Illustrated Monthly Magazine

Devoted to the Science of Religion, the Religion of Science and the Extension of the Religious Parliament Idea.

Science is slowly but surely transforming the world.

Science is knowledge verified; it is Truth proved; and Truth will always conquer in the end.

The power of Science is irresistible.

Science is the still small voice; it is not profane, it is sacred; it is not human, it is superhuman; Science is a divine revelation.

Convinced of the religious significance of Science, *The Open Court* believes that there is a holiness in scientific truth which is not as yet recognised in its full significance either by scientists or religious leaders. The scientific spirit, if it but be a genuine devotion to Truth, contains a remedy for many ills; it leads the way of conservative progress and comes not to destroy but to fulfil

The Open Court on the one hand is devoted to the *Science of Religion;* it investigates the religious problems in the domain of philosophy, psychology, and history; and on the other hand advocates the *Religion of Science*. It believes that Science can work out a reform within the Churches that will preserve of religion all that is true, and good, and wholesome.

Illustrated Catalogue and sample copies free.

The Open Court Publishing Company

324 Dearborn Street, CHICAGO.

THE RELIEF IS PROMPT,
THE CURE IS PERMANENT,
IF YOU PRESCRIBE

Anusol Suppositories

THE SPECIFIC FOR PILES
AND REMEDY FOR CONSTIPATION.

PAINLESS, HARMLESS, CERTAIN.

SCHERING & GLATZ,
58 Malden Lane, New York.

LITERATURE ON APPLICATION.

Dr. Chas. H. Shepard's Sanitarium.

31 COLUMBIA HEIGHTS, BROOKLYN, N. Y.

For the treatment of Disease by TURKISH BATHS, DIET, ELECTRICITY, MASSAGE, e

Send for Pamphlet on Rheumatism.

PUBLIC HEALTH—WHAT DOES IT STAND FOR

"Unpurchased Health! that dost thy aid impart
Both to the Patient and the Doctor's art!"

PURE FOOD, PURE WATER, FRESH AIR AND HYGIENIC LIVING:

These are what we contend for. Ask for a sample copy.

C. P. WOOD, - - - - 108 Powell Ave., EVANSVILLE, IND.

Established 1884 **THE WEST AMERICAN SCIENTIST** $1.00 A YEAR 10 CENTS A COPY

Charles Russell Orcutt, Editor, San Diego, California.

"*DECIDEDLY* THE BEST OF ITS CLASS."

-Progressive-
— Decline —

When a patient continues to fail, in spite of the specific and general medication that is being administered add to your treatment Colden's Liquid Beef Tonic. You will shortly observe an increasing return of appetite, color spirits, weight, strength and activity.

This is not a theory; it is a fact proven by years of use and never yet disproved. Specify "Ext. carnis fl. Comp (Colden)" and see that your druggist supplies it.

Literature mailed to physicians on request.

THE CHARLES N. CRITTENTON CO.

Sole Agents for the United States,

115-117 FULTON STREET, NEW YORK.

LISTERINE

A Non-toxic, Non-irritant, Non-escharotic Antiseptic

Absolutely Safe, Agreeable and Convenient

Listerine is a well-proven antiseptic agent—an antizymotic—especially useful in the management of catarrhal conditions of the mucous membrane, adapted to internal use, and to make and maintain surgically clean—aseptic—all parts of the human body, whether by spray, injection, irrigation, atomization, inhalation, or simple local application.

Listerine is a swift and sure destroyer of infusorial life; it prevents the various fermentations, preserves animal tissues and inhibits the activity, growth and motion of low forms of vegetable life: hence Listerine may be relied upon to destroy the activity of the living particles which constitute contagion whenever brought into intimate contact therewith.

For Diseases of the Uric Acid Diathesis:

Lambert's Lithiated Hydrangea

A remedy of acknowledged value in the treatment of all diseases of the urinary system and of especial utility in the train of evil effects arising from a uric acid diathesis.

Descriptive literature may be had upon application to the Manufacturers--

Lambert Pharmacal Co.

ST. LOUIS, U. S. A.

Be assured of Genuine Listerine by purchasing an original package

GREAT COMBINATION OFFER

ESTABLISHED 1887

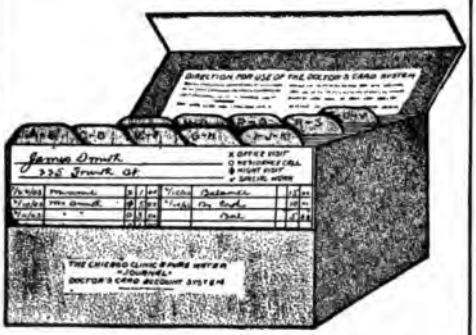
THE CHICAGO CLINIC AND PURE WATER JOURNAL

The cleverest and brightest ILLUSTRATED MEDICAL JOURNAL in America. The only journal devoting attention to mineral waters, health resorts and travel for health. Up-to-date on general medicine and surgery,

TOGETHER WITH

The Doctor's Card Account System

COMPLETE



A card system of keeping doctor's accounts which will save money, labor and time. Does away with all account books. If you use it you will never go back to books. Complete with specially ruled and printed cards, index guide cards and neat case.

BOTH THE MAGAZINE ONE YEAR ACCOUNT CASE COMPLETE

$1.00

SEND $1.00 TO-DAY TO

The Chicago Clinic & Pure Water Journal

40 DEARBORN STREET - CHICAGO

OLD SUBSCRIBERS PAYING BACK *ACCOUNTS* AND ONE YEAR IN AD-*VANCE* MAY HAVE THE ACCOUNT *SYSTEM* ON APPLICATION.

POLK'S MEDICAL REGISTE AND DIRECTOR

(ESTABLISHED 1886.)

The only complete Medical Directc

Its Information is Procured fr Original and Official Sources.

The only Medical Directory havi an Index to all Physicians in the United States.

The Publishers possess the

Only Complete List of Colle Graduates

in existence, many colleges havi become extinct, and the records others having been lost or destroye

See that the name R. L. Polk & C is on the subscription order.

R. L. POLK & CO., Publishers, DETROIT, MICHIGAN.

RIVER CREST,

ASTORIA, L. I., N. Y. CITY

(Long Distance Telephone, 36 Astoria.)

For MENTAL AND NERVOUS DISEASES, ALC HOLIC AND DRUG HABITUES. Splendidly cated and equipped; very accessible; near Street ferry; under State license.

J. JOS. KINDRED, M.D., Consultant. | WM. E. DOLD, M. Physician-in-Charg

City Office: 1125 Madison Ave.. cor. 84th St. Hours 2 to 3 dai

PATENTS

promptly obtained OR NO FEE. Trade-Marks, Caveats, Copyrights and Labels registered. TWENTY YEARS' PRACTICE. Highest references. Send model, sketch or photo. for free report on patentability. All business confidential. HAND-BOOK FREE. Explains everything. Tells How to Obtain and Sell Patents, What Inventions Will Pay, How to Get a Partner, explains best mechanical movements, and contains 300 other subjects of importance to inventors. *Address,*

H. B. WILLSON & CO. Patent Attorneys

333 F Street, N. W., WASHINGTON, D. C.

SANMETTO FOR GENITO-URINARY DISEASES.

A Scientific Blending of True Santal and Saw Palmetto in a Pleasant Aromatic Vehicle.

A Vitalizing Tonic to the Reproductive System.

SPECIALLY VALUABLE IN
PROSTATIC TROUBLES OF OLD MEN—IRRITABLE BLADDER—
CYSTITIS—URETHRITIS—PRE-SENILITY.

DOSE:—One Teaspoonful Four Times a Day. OD CHEM. CO., NEW YORK.

SUPPORTING BELTS

For every condition requiring ab dominal support.

Our Belts give satisfaction becaus they are "Made to Fit."

Quality the Best. Prices Moderate

A trial will convince.

POMEROY COMPANY

NEW YORK: 17 Union Sq. BROOKLYN: 414-416 Fulton S

TAMAR INDIEN BRILLON.

A laxative, refreshing, and medicated Fruit Lozenge, very agreeable take, and never causing irritation. Its physiological action assures the immediate relief and effectual cure of

CONSTIPATION,

HÆMORRHOIDS, BILE, CEREBRAL CONGESTION, HEADACH LOSS OF APPETITE, INTESTINAL OBSTRUCTIONS, &c.

By augmenting the peristaltic movements of the intestine without pr ducing undue secretion of the liquids. Unlike pills and the usual purg tives, it does not predispose to intestinal sluggishness; and the same do always produces the same effect—that is to say, never needs increasing.

It is recommended by the most eminent physicians of Paris, notab Drs. BELIN and TARDIEU, who prescribe it constantly for the above co plaints, and with the most marked success.

WHOLESALE—PARIS, 33 RUE DES ARCHIVES.

Sold by all Chemists and Druggists.

The Medico-Legal Journal.

A Quarterly Journal **Devoted Exclusively to Medical Jurisprudence,**

With Departments on RAILWAY SURGERY—PSYCHOLOGICAL—TOXICOLOGICAL—and the MEDICAL JURISPRUDENCE OF INSANITY.

Edited by CLARK BELL, Esq., and an able corps of collaborators.

Price only $3.00 per annum, payable in advance. | *Published at No. 57 Broadway, in the City of New York.*

OPINIONS OF THE CHIEF JUSTICES OF SUPREME COURT.

SUPREME COURT OF ERRORS, STATE OF CONNECTICUT.

Hon. CLARK BELL: LITCHFIELD, Nov. 5, 1894.

My Dear Sir: I have been a subscriber to the MEDICO-LEGAL JOURNAL now for about four years. I have read it with great interest, and have found it always entertaining and many times highly useful. To a State Attorney, or to any lawyer engaged in criminal practice, I should suppose it to be of great value. Yours very truly, CHARLES B. ANDREWS.

CLARK BELL, Esq., New York: ATLANTA, Ga., Nov. 23, 1894.

Dear Sir: During the time I occupied the Bench as Chief Justice of the Supreme Court of Georgia, I regarded the MEDICO-LEGAL JOURNAL as one of the current periodicals to be regularly read in order to keep up with the best thought touching medical jurisprudence. Besides this, almost every number contained matter, historical or biological, of much interest. I do not hesitate to say that every lawyer, whether on the bench or at the bar, will, on trial, find the work both useful and entertaining. It gives me pleasure to recommend it. Very respectfully, L. E. BLECKLEY.

SUPREME COURT, STATE OF KANSAS.

TOPEKA, Nov. 19, 1894.

CLARK BELL, Esq., 57 Broadway, New York City, N. Y.:

My Dear Sir: I have been a subscriber to the MEDICO-LEGAL JOURNAL for several years, and find it a valuable and useful publication, especially to the members of the legal profession. The numerous articles appearing therein concerning the criminal classes, expert medical testimony, and the relation of the science of medicine to the science of jurisprudence, have been written by the very ablest physicians and lawyers. Much important information to the bench and bar can be derived from this journal not obtained elsewhere. Yours, etc., ALBERT H. HORTON.

SUPREME COURT OF NORTH CAROLINA.

CLARK BELL, Esq.: RALEIGH, N. C., Dec. 1, 1894.

Dear Sir: We regard the MEDICO-LEGAL JOURNAL as a periodical of great value to the legal profession, and especially to those engaged in criminal and probate justice, and also in damage cases.

I trust that the publication will receive the encouragement that its merits so richly deserve. Respectfully, etc., JAS. E. SHEPHERD.

SUPREME COURT OF TEXAS. AUSTIN, 1894.

I have had occasion to read and examine the MEDICO-LEGAL JOURNAL, edited by Clark Bell, Esquire, of New York, and have found it an able and interesting publication. It is useful to all who are concerned with the jurisprudence relating to insanity, and I would especially commend it to the judges of criminal courts and to prosecuting officers throughout the country.

R. R. GAINES.

Address CLARK BELL, Esq., 57 Broadway, New York City.

THE SANITARIAN.

Bound Volumes at Greatly Reduced Prices.

TY-TWO VOLUMES—Full Series; 1873 to June 1904 (1873 to 1883, on volume annually, since two): $100.00, expressage paid.

Altogether, the Most Complete Cyclopedia of Practical Sanitation Extant.

lumes 1, 10, 11, 12, 13, 14, 15, 16, 17, 18 and 19 cannot be supplied except li full set: excepting these: $2.00 a volume, postage paid.

A FEW of the subjects fully treated in the first series of 10 volumes are Abattoirs; Adulterated Foods; Biographical Sketches, with Portraits o lwin Chadwick, William Farr, Max Josef v. Pettenkofer, Rudolf L. C. Virchow lmund Alexander Parkes; Contagious Diseases Acts—the Prevention of Vene al Diseases; Deformities and Hygiene; Dwelling Houses for Working People xcessive Death-rate Among Children; Filth Diseases; Garbage Disposal; Health :gislation; Health of Rowing Men; House Drainage and Sanitary Plumbing *ustrated;* Infant Diet; Milk Analysis; Panama Canal Sanitation; Perils of Immi ants; Perils of the Schoolroom; Perils of Massing Population in Cities; Public arks and Camping Grounds; Pure Water Supplies; Quarantine; Relation of ertain Diseases to Cold Weather; Roman, Russian and Turkish Baths; Sanitary nferences; Sanitary Inspection of Steamboats and Other Vessels; Sanitary risprudence; Sanitary Resorts; School Sanitation; Sewage Disposal; Small x—How Spread; Soil Drainage; Tenement Houses; Tuberculosis in Milch ws, and the Danger Therefrom; Vaccination—Protective Power of; Ventilation

OL. II FOR 1883. Quarto (published weekly), 833 pages.

A few of the important subjects treated in this volume are: Atlantic Coas ealth Resorts; Army Hygiene; Cattle Diseases; Cholera; Climate in Town and untry; Infection—Channels of Conveyance of to Households; Health Foods alaria; Milk Supply; Naval Hygiene; Sanitary Aspect of House Construction nitary and Medical Service on board Passenger Vessels; Typhoid Fever; Utili tion of Refuse.

ls. 12 to 52—1884 to June 1904—Forty-one Volumes, two annually, 576 pages.

These volumes are replete with the most advanced views on practical sanitation the most distinguished writers.

Unbound Stock, 35 Cents a Number.

All orders should be addressed to A. N. Bell, M. D.,
337 Clinton Street,
Brooklyn, N. Y.

ECHOL, NEITHER ALTERATIVE NOR ANTISEPTIC IN THE SENSE IN WHICH THOSE WORDS ARE USUALLY UNDERSTOOD. IT IS ANTI-PURULENT, ANTI-MORBIFIC--A CORRECTOR OF THE DEPRAVED CONDITION OF THE FLUIDS AND TISSUES.

SAMPLE (12-oz.) BOTTLE SENT FREE ON RECEIPT OF 25 CTS.

FORMULA:--Active principles of Echinacia and Thuja.

BROMIDIA
IODIA
PAPINE

BATTLE & CO., CHEMISTS CORPORATION, ST. LOUIS, MO., U.S.A.

FOR THE WINTER GO TO

BERMUDA

FROM NEW YORK.

Frost Unknown. Malaria Impossible.

Bermuda scenery is exquisitely tropical and most picturesque. The roads are generally level, with easy grades over the hills and are constructed entirely of *lime and coral stone*, free from dust and mud and *perfect for cycling*. Bermuda is the Winter station for the English Atlantic Squadron. Temperature in November, December and January about 65 degrees.

48 HOURS

By Elegant Steamships, Weekly.

Fine [illegible] steamships sail twice each week from New York [illegible] Bermuda in March and April.

FOR WINTER CRUISES GO TO

WEST INDIES.

30 Days' Trip 20 Days in the Tropics.

[illegible] St. Kitts, Antigua, Dominica, Martinique, St. Lucia, Barbados, Trinidad, Demerara, Grenada, St. Vincent, Barbados.

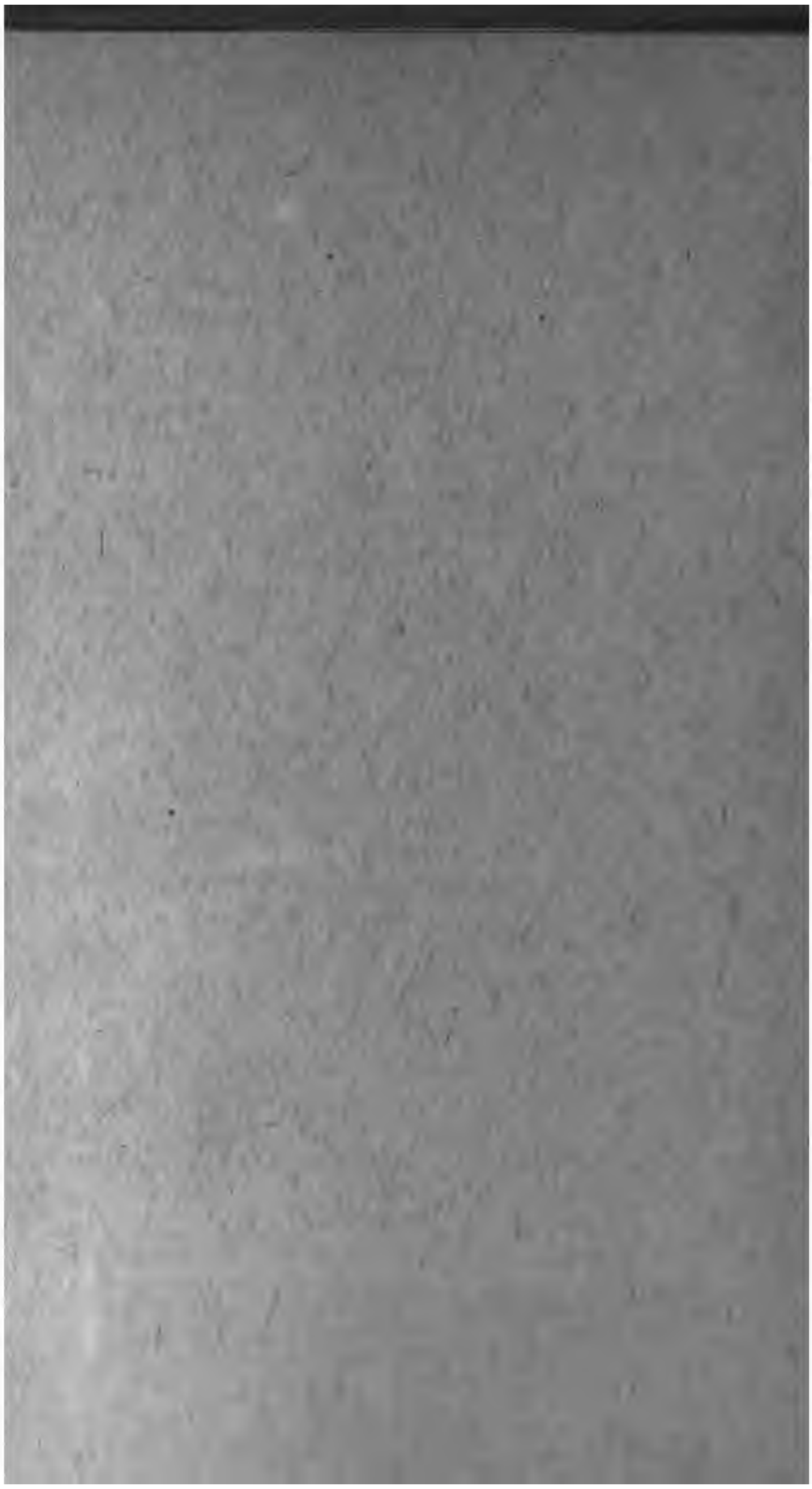
[illegible] the Antilles.

A. E. Outerbridge & Co., [illegible], 22 Front St., Hamilton, Bermuda.
Ltd., 39 Broadway, New York, N. Y.

Thos. Cook & Son, 261 Broadway, New York, N. Y.

Arthur Ahern, Secretary, Quebec, Canada.

Intelligent Women USE Pearl for Was
Because
by doing away with the rubbing it prolo
the life and beauty of delicate Fabr
Besides-PEARLINE enables
any woman to do coarse Washir
Simply a Matter of Intellige



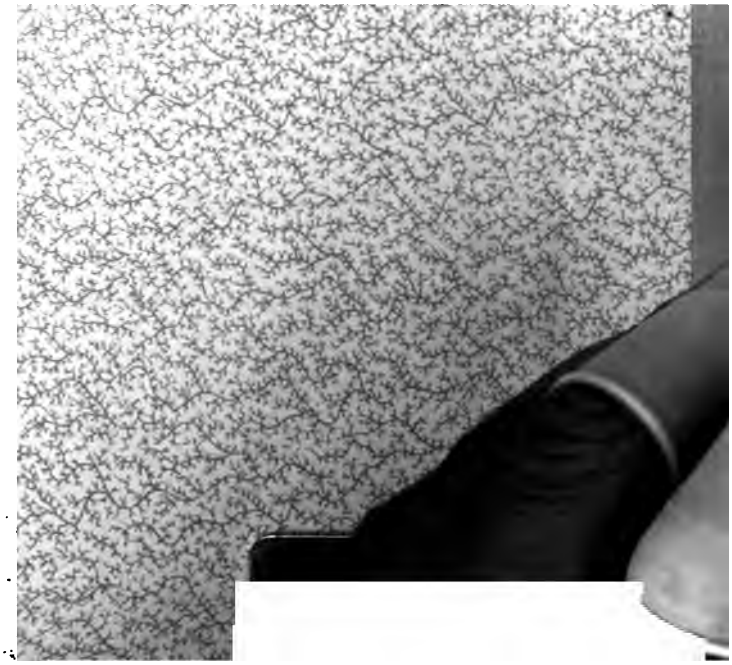
THE NEW YORK PUBLIC LIBRARY
REFERENCE DEPARTMENT

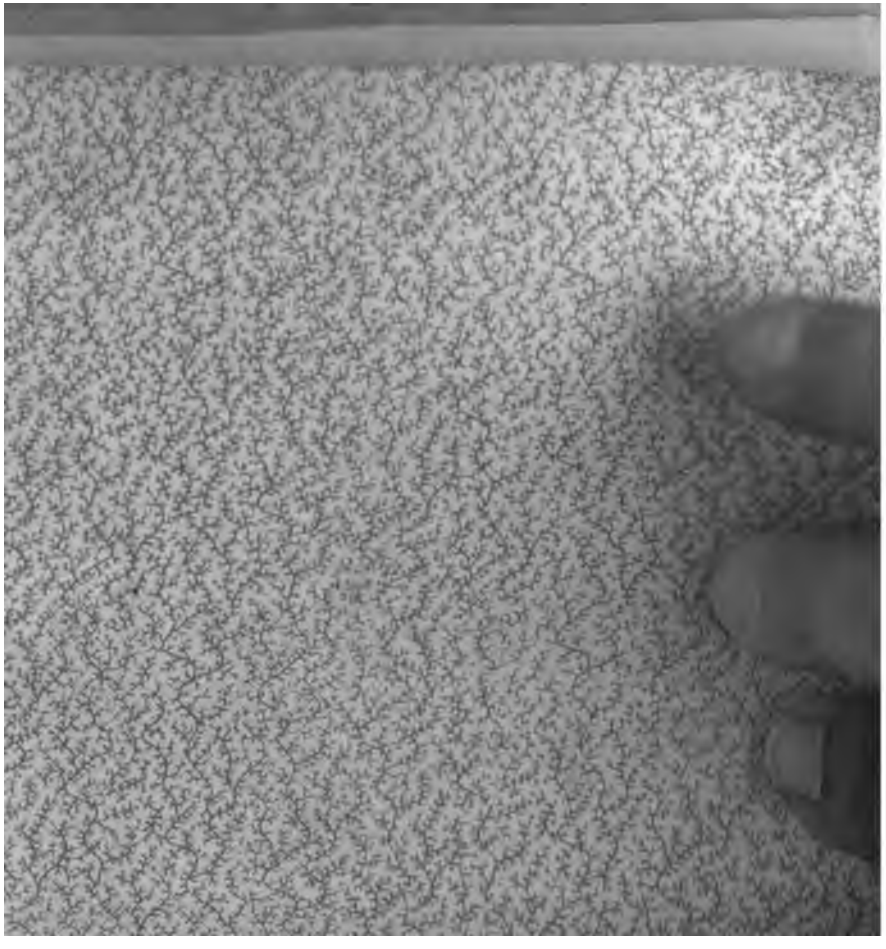
This book is under no circumstances to be taken from the Building

Form 419

SEP 8 - 1926

NYPL RESEARCH LIBRARIES
3 3433 07597765 6





= [illegible]

REPORT

OF THE

BOARD OF HEALTH

OF THE

STATE OF NEW JERSEY

1877.

I.

TRENTON, N. J.:
NAAR, DAY & NAAR, PRINTERS
1877.

Report of the Corresponding Secretary.

By the act establishing a State Board of Health for the State of New Jersey, it was made the duty of the board to make report to the Governor, in the month of December, of its investigations and opinions, with such suggestions as it might deem necessary.

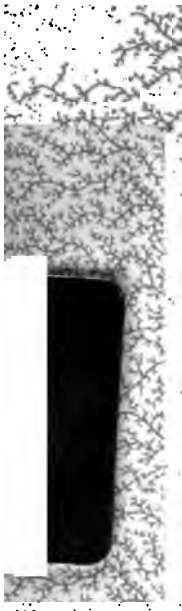
The act further specifies, "That the board shall take cognizance of the interests of health and life among the citizens of this State; they shall make sanitary investigations and inquiries in respect to the people, the causes of disease, and especially of epidemics, and the sources of mortality, and the effects of localities, employments, conditions and circumstances on the public health; and they shall gather such information in respect to these matters as they may deem proper for diffusion among the people; they shall also make inquiries and reports in reference to diseases affecting animals and the methods of prevention."

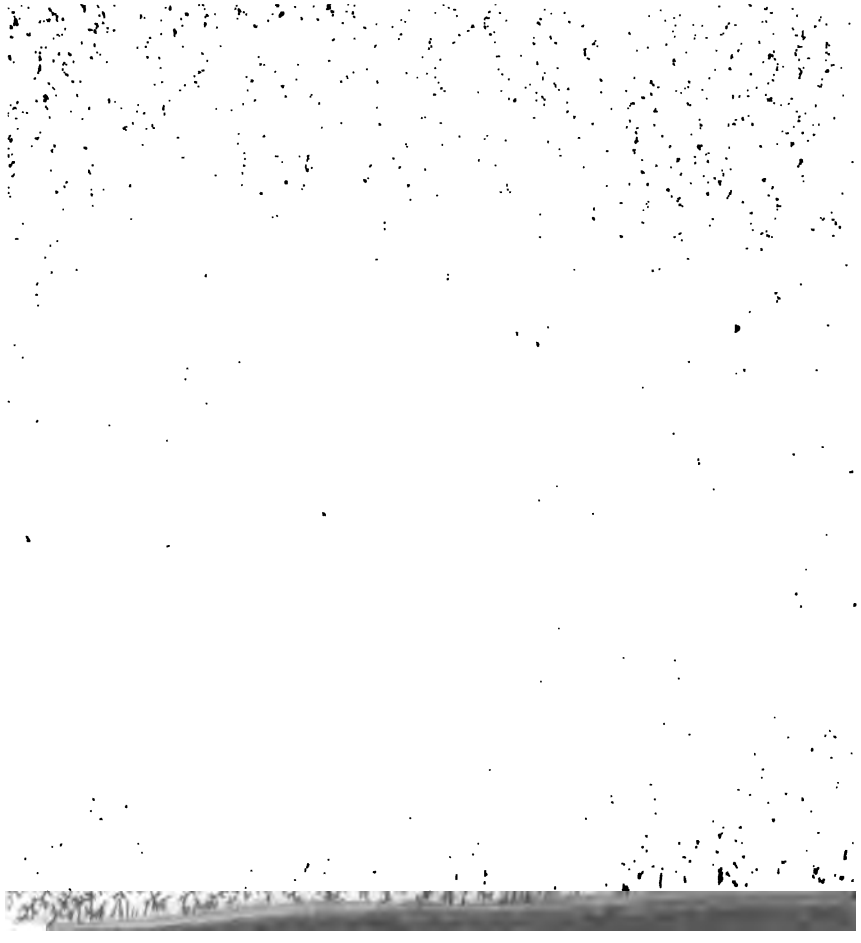
In this, our initial report, it seems proper that we should first make reference to some of the considerations which have led to the formation of this board.

The recognition of a need that the State should conserve the welfare of the citizen for his health and for its protection, as well as in other regards, is no new theory.

The idea seems so far to commend itself for an axiom, as to make it an inherent part of the protection of life to which the principles of common law entitle us. Indeed, it has almost been assumed that the law of self-preservation was so emphatic that no one needed to be guarded or instructed as to his own health, and that a trespass on the health of others was such a palpable infringement of personal rights as almost to work its own limitation. Although it was soon found that what ought to be by nature is not by practice, yet legislation was chiefly confined to the sudden invasion of epidemics, and to a dealing with the results rather than the causes of disease.

A higher step was taken when the demand was made that





$$= H_{\text{...}}$$

REPORT

OF THE

BOARD OF HEALTH

OF THE

STATE OF NEW JERSEY

1877.

I.

TRENTON, N. J.:
NAAR, DAY & NAAR, PRINTERS
1877.

APR
1888
NEW-YORK

Report of the Corresponding Secretary.

By the act establishing a State Board of Health for the State of New Jersey, it was made the duty of the board to make report to the Governor, in the month of December, of its investigations and opinions, with such suggestions as it might deem necessary.

The act further specifies, "That the board shall take cognizance of the interests of health and life among the citizens of this State; they shall make sanitary investigations and inquiries in respect to the people, the causes of disease, and especially of epidemics, and the sources of mortality, and the effects of localities, employments, conditions and circumstances on the public health; and they shall gather such information in respect to these matters as they may deem proper for diffusion among the people; they shall also make inquiries and reports in reference to diseases affecting animals and the methods of prevention."

In this, our initial report, it seems proper that we should first make reference to some of the considerations which have led to the formation of this board.

The recognition of a need that the State should conserve the welfare of the citizen for his health and for its protection, as well as in other regards, is no new theory.

The idea seems so far to commend itself for an axiom, as to make it an inherent part of the protection of life to which the principles of common law entitle us. Indeed, it has almost been assumed that the law of self-preservation was so emphatic that no one needed to be guarded or instructed as to his own health, and that a trespass on the health of others was such a palpable infringement of personal rights as almost to work its own limitation. Although it was soon found that what ought to be by nature is not by practice, yet legislation was chiefly confined to the sudden invasion of epidemics, and to a dealing with the results rather than the causes of disease.

A higher step was taken when the demand was made that

those who attempted the alleviation of disease, should be certified as to their competency by those of tested skill in their own department of service.

The next step early taken in our own State was an attempt at the securement of such statistics as to births, marriages and deaths as would give information as to the actual condition of the population.

These records, however, were chiefly valued in their bearing on legal questions, as to descent, intermarriage, and inheritance, and thus were only made indirectly available as indicating the numerical and social status of the population.

The thought seems scarcely to have occurred how informing they might become as to great social, economic and preservative life problems.

Later on in our history we find some recognition of the claims of inoculation, vaccination and quarantine as bearing upon the limitation or prevention of epidemic diseases.

So long as disabilities and diseases causing impairment of physical power or death were regarded as only accidental, providential, or unavoidable, there was no room for any State action except to mitigate resultant burdens.

But as soon as it came to be recognized that very many of the causes of impairment of vigor, of disease and of death, are within the range and the duty of human control, so soon it became the interest of the State to inquire into the bearing of legislative precaution on such facts. This all the more because it is but too evident that modern civilization and improvements have introduced so much that is artificial in living, so many conveniences fraught with peril, that we must meet these new exigencies by increasing vigilance and increasing knowledge and by skillful methods of compensation.

Thus facts have been brought into view which have caused such governments as those of England, Germany and France to devote large attention to these matters.

Statesmen and legislators, in defence of the public weal, have been led to investigate the great questions of population and the prevention of disease as a part of the functions of the State. Inquiries instituted under governmental sanction and control have given such astounding evidences of their importance to civic and national welfare, as to eventuate in systematic public

health services for most of the European kingdoms. To statesmen, to scientists, and to professional men in various departments, it is well known how increasingly and potentially the study and abatement of causes tending to deteriorate the public health have commended themselves to national and local administrations.

While the method of governmental concern over any great public interest is always a matter for practical advisement, the need of the weighty consideration of these great interests is so far conceded abroad as to be no longer questioned.

The present Prime Minister of England only expresses an admitted but not realized truth when he says: "The health of the people is really the foundation upon which all true happiness and all true power of a State depends. The health of the people is the first duty of the statesman."

Gladstone, in an article on the Nineteenth Century, specifies the becoming more largely acquainted with the laws of health "as one of the subjects within the sphere of authority, and of conviction and action founded thereupon."

Pauperism and crime, as well as insanity and reform, have to be studied in the relations of state sanitation and legislation; for the prison-house, the asylum and the reformatory attest how closely they touch the public interest. Great questions of jurisprudence are very frequently before our courts in their sanitary and medical regards, in order to determine their legal aspects. Abroad, it is customary to rank all questions of mental invalidity and of medical jurisprudence, as well as very many questions of social science, within the domain of Public Hygiene.

In America, not less definite and decisive is the recognition of the necessity of some action. The various studies and bearings of sanitary protection have been pursued with considerable zeal. Our National Government, in the army and navy, in the District of Columbia, by its laws for the marine service, in its careful study of methods and returns, and in various ways, is showing its effort to conserve the welfare of the people in protection from avoidable perils so far as they come within the sphere of its legislation. States, in their soverign capacity, are not less concerned, and already fourteen of them have State Boards of Health, with powers and entrustments in most cases largely in advance of those of our own.

Many of these have been long enough in existence to show excellent results, and have not only increased in public favor but in legislative consideration. Indeed, it is believed by many that the time has arrived when all our States should have Boards of Health, not with plenary authority, but organized so that our legislators can call for expert opinion upon all questions which in a sanitary way concern the welfare of the citizen. Had such been the case in our own State, we could point to many cases in which losses would have been spared to our treasury from well intended but ill advised expenditures on public buildings, and for charities of various grades.

So far as your board knows, the first general sanitary inquiry in this State, made under legislative direction, was that of 1866.

The Legislature of 1865–6 appointed a State Sanitary Commission, consisting of

J. B. Coleman, Trenton,
R. M. Cooper, Camden,
Thomas Ryerson, Newton,
Isaac A. Nichols, Newark,
Ezra M. Hunt, Metuchen.

It was the duty of the commissioners to furnish to the Governor a report as to "the general sanitary condition of the State and as to the prevention of epidemic and contagious diseases; as to the vaccination of the indigent, the condition of the insane in township and county houses, and all such other facts and particulars with such suggestions and advice as will, in their opinion, conduce to future enlightened action for the promotion of the public health."

A reference to that report will show that the commission was diligent in its inquiries and elicited many facts of importance. Its services were recognized in connection with the cholera of that year, and various points brought to light in that report have had a bearing upon popular opinion and individual conviction since.

From the time of the report made in 1866–7, to 1873 there was no investigating legislation in respect to the public health.

It was believed that greater intelligence and conviction was needed as to the dependency of much of ill health, disease and death on preventable causes. As facts in these regards were being accumulated, both in this and in foreign countries, and as

our needs were becoming more apparent, not only to physicians, but to others whose calling and observations led to inquiry in this direction, it was better to abide the time when an improved public opinion or a better appreciation on the part of our governing authorities should favor further investigation; accordingly, it was not until the winter of 1873–4 that the Legislature passed an act for a commission which was to all intents a Board of Health, but whose services were limited to a single year.

This commission consisted of

James R. Mercier, of Jersey City,
Hon. Samuel Lilly, of Lambertville,
Prof. Geo. H. Cook, of New Brunswick,
William Elmer, of Trenton,
Lewis W. Oakley, of Elizabeth,
Ezra M. Hunt, of Metuchen.

This commission instituted extended and systematic inquiry through various portions of our State. It was furnished with abundant evidence that we are not exempt from most unsanitary conditions which obtain in other States, and that we have the same need of thorough attention to methods for protecting the people from the avoidable causes of disease and death. Indeed some of our rural districts were found to be suffering to an exceptional extent with identified and indisputable sources of sickness, while even some of our larger cities revealed a degree of inattention to civic sanitation which did not admit of defence before those at all familiar with recognized and established principles of hygiene.

The report condensed some of the more important information derived from good authorities in divers localities in our State. These showed how fevers, lung diseases, miasmata, were directly traceable to their causes.

Questions as to water supply and sewerage, as to tenement population, arts and trades, as to schools, as to ventilation and heating, as to protection from adulterated and improper foods, as to the health condition of animals, and as to vital statistics, were carefully discussed in the view of accumulated facts.

The report made by the board became the property of the State, and by its circulation both in pamphlet form and through the press, aided much in the dissemination of health-saving knowledge among the people.

As one of the results, a sanitary convention was held in October, 1875, for the purpose of considering the best means for promoting and preserving the health of the towns and cities of the State, and for consultation as to the means to be adopted to prevent the occurrence or spread of disease.

The association has ever since commanded the attention of many of our most prominent citizens, and has perseveringly revealed how much can be done intelligently and effectually to protect our people from very many of those prevalent causes of disease which are an incubus on capital and labor, not less than upon the individual sufferers.

In the winter of 1876–7, your honorable Legislature saw fit to follow the course of many other States, in the appointment of a State Board of Health, to whom should be committed the duty of inquiry and suggestion as to those matters of public interest, which would naturally fall within the scope of their investigation. The Governor had been among those long recognizing the need of some such Health Board, and having given the law his sanction May 22d, 1877, appointed the following persons together with the Secretary of State, and the Attorney-General, who are members *ex-officio*, to constitute said board:

Ezra R. Osborne, C. E., for one year,
Elias J. Marsh, two years,
Laban Dennis, three years,
Prof. Cyrus Brackett, four years,
James M. Ridge, five years,
Theodore R. Varick, six years,
Ezra M. Hunt, seven years,
Hon. H. C. Kelsey, Secretary of State *ex-officio*,
Hon. John P. Stockton, Attorney General, *ex-officio*.

A copy of the law will be found as an appendix to this report.

The board was first called together by Governor Bedle for organization May 22d, 1877, and His Excellency invited to sit with it at its opening meeting.

Ezra M. Hunt was appointed chairman pro tem., and by invitation of the board, addressed it as follows:

Gentlemen:

As we are about to organize into a State Board of Health it may be opportune for me to say something of the antecedents,

which have led to the action of the Legislature, by which this board has been constituted, and of the occasion there is for some such organization in the State.

While there has always been on the part of enlightened nations some attention to matters involving the health of the citizen, as a rule it was anciently confined to alarming epidemics or to those obtrusive nuisances which forced themselves by manifold odors upon public attention. With the progress of medical science, of engineering, of the various physical sciences and of free school education, some of our lawmakers have come to realize that the laws of cause and effect are as definite in the domain of invalidity as they are in the relations which result in good health and normal endurance. When this is manifested in the actual seizures of disease it finds a direct relation to the art of the medical practitioner. But so soon as it becomes apparent that a large ratio of the inflictions of sickness is preventable, so soon there is a domain outside the business relations of a profession which concerns the citizen and the commonwealth.

The geologist feels it not foreign to his work to inquire what telluric conditions affect the physical condition of those who dwell upon the soil. The meteorologist is quite willing to take into consideration the bearings of heat, moisture and all atmospheric conditions upon animal health and life. The Entomologist, knowing that over fifty diseases are owing to parasites and that germs are shown to be somehow connected with many diseases, quite naturally contributes his quota in the study of insect life.

The chemist readily recognizes the relation of his art to the detection of unfriendly substances in food and air and water. The physicist in all his departments knows that manifold facts under his cognizance need his aid and demonstrations to show their practical bearings upon the conditions of physical existence. The architect and engineer readily see how the structures of habitations above ground or the preparation for them and for the removal of household debris require their aid. The physician, as dealing most directly with the human body, of course in the line of his calling, is brought in direct contact with the conditions and circumstances which favor ill health. But if intelligent as to sanitary matters he rapidly recognizes that here is a field in which the workers and the appliances are not exclu-

sively professional, but are such as to command the attention of those of various occupations and are deserving of the study of society at large. We thus meet on common ground, each desiring to bring all that his individual domain may afford. Although thus employing many factors, sanitary science is itself a distinct department. As such, in the University of Edinburg, for instance, it has its place for a degree in science, not as a department of one of the liberal professions but alongside of (*a*) physical and natural science; (*b*) engineering; (*c*) mental philosphy; (*d*) philology.

In this and many other ways has the science of public health come to be authenticated. Every science has its art. The art of this science is the art of preserving health It is not difficult at once to see that if there is such an art with a science behind it, it has great bearings upon political economy and is a weighty legislative concern.

There is no need of argument to show that sickness is one of the greatest of all burdens upon national prosperity. That which is the most prevalent discomfort of households and individuals, if preventable, cannot escape the care of the statesman. Indeed the welfare of the State is largely dependent upon the health of its inhabitants. It is not only a comfortable but a material interest. It makes a wide difference to us politically whether the death rate is 16 per thousand as in Massachusetts or 40 per thousand as in some of our cities.

It is a matter of civic import if, under a lax law there are, during a period of fifty years, 35 out of every 1,000 deaths by small pox, while in another country equally exposed, by reason of more stringent preventive acts, there are only 7 to a thousand. 388,340 deaths by scarlet fever in twenty years in England, is an item for political economy to consider, if a large per centage of these is avoidable.

Every death, too, represents very many other cases of sickness and suspended labor, and causes expenditure of labor by others, a large portion of which is not of a profitable kind. Epidemics sometimes make themselves so felt, that besides the home mournings the city is appalled at its business depletion. But more potent than these are the silent forces of lung, bowel and brain affections, which, like the small musketry of batta-

lions, disturb, decimate and despond society more than the occasional cannonade.

Dr. Farr has made a calculation, based on a decade or more of accurate statistics in a district of England, to show the value of healthy men and women and of an average life in a commercial aspect, and so has reckoned the enormous deficit made by preventable sickness.

Apparent as are such facts, so long as methods of prevention were unrecognized or the dependency of disease upon ascertainable and abatable forces only mildly affirmed, the time had not come for the exercise of any general system of limitation or repression on the part of governments. When the plague, or cholera, or yellow fever came, the only activity of government could be in limiting its results by caring for its victims and in aiding the flight of those who could escape. The observation that some such diseases arrived like foreigners led to quarantines, but even these were often so defective as to make a nidus for pest.

But amid the modern studies of disease which have been aided by physical science and directed by new methods of classified observation, series of facts have been elicited, which show that man is an animal with laws of development and preservation as definite as those which obtain in any other sphere of nature. While there are limitations to existence within certain defined limits, there are laws of preservation, of protection, and of deliverance from many maladies. These are not casual but precise. Nay, more, the contagions themselves admit of limitation, and the duration and validity of a life is, by the ordering of a kind Providence, very directly in the keeping of the individual and of society as organized in the State.

I need only very briefly to allude to a few of these by way of illustration:

Small pox, once the scourge of nations, and still, by reason of manifold neglects, resident in every State, is so preventable that under a stringent law Ireland had in one year but three deaths therefrom.

Typhoid fever is so directly the result of a specific poison, that we have come to know very many of the conditions of its incubation, and proper surface and underground sanitation will largely abate it.

The various bowel diseases which, especially in our own country, destroys so many thousands of infant population, have very ascertainable relations to bad dwellings, bad water, bad drainage and interference with proper temperature and ventilation.

A large class of seizures, such as diphtheria, scarlet fever, measles, etc., are recognized as dependent for their virulency upon avoidable local conditions, which can be largely remedied.

Miasmatic diseases, which in this and other States are a great tax upon labor, have much to do with undrained lands and injudicious exposures, and so have many causes within the reach of hygiene.

Consumption and other lung affections have in late years been shown to have much to do with soil moisture and with atmospheric conditions, which can be guarded against easier than the actual disease can be cured.

Besides all these, there are constitutional and hereditary diseases the means of limiting or eradicating which are within the reach of preventive art, so that malformation, insanity, etc., come within the perview of interruption.

We refer to these as but a few examples of the large area to which sanitation relates.

Even independent of these, one department of health and life has long been recognized as worthy of registry by the State. As the design of a census is not merely to flatter a pride of progress, but to acquaint a people with the condition, employments and extent of its population, to inform as to military or defensive ability, and to indicate the direction and conditions of development, it was rightly considered that births, marriages and deaths are important items in such information. Accordingly statistics have been secured in their merely numerical bearings.

But the study of all census returns has made rapid advance in the last few years. Prof. Francis A. Walker, as Superintendent of the ninth United States Census, gave special prominence to the importance of such returns, and in common with similar officers in other countries, has shown that in more senses than one they are vital statistics. In cities their value is now so practical that they are used as the direct indications for holding in check the evil communication of preventable epidemics, while

the facts obtained over large areas of territory are being studied with satisfactory results by registrating statisticians.

All these and many like facts make it apparent that the time has come when definite methods can be put in operation for guarding and conserving those interests which touch the citizen in that which is his most vital and inalienable right—protection from the avoidable causes of disease or death.

Moved by such considerations, England has now its Government Board, which extends its sanitary supervision to the whole kingdom. The statistics of the Registrar General are often so definite as to enable the government to put out signals of disease as veritable as those relating to approaching storms. It used to be thought by some that the country at large did not need any legislation in this direction, as diseases found their chief carnival in crowded populations. But the country has its special local impairments as definite as those of the city. The imperfect drainage, the damp cellars and contaminated wells of the one quite parallel the sewers, basements and befouled waters of the other. The study of the causes of disease can often be more technically made in sparse populations than amid crowded localities. So true is this that Sir Wm. Jenner, of London, in a recent discussion of the views of Murchison, as to the origin of typhoid fever, has said (1875) the only way of settling the question is "to thoroughly scrutinize every isolated case that occurs in out of the way country places."

In fact the diseases of the city often arise from the country, and vice versa. The severe outbreak of typhoid fever in Leeds, 1873; that at Marylebone, London, and the one in Glasgow, arrived from dairy farms several miles in the country, and water and other contaminations do not always occur at the place of outflow and delivery. Again, it is only by studies over large areas that we can estimate coincidences and account for differences and so arrive at the laws of disease-productivity. Facts in one locality or in one class of population are often misleading, while comparisons and contrasts are most informing. Indeed, among sanitarians, the question of the necessity of territorial observation is no longer discussed.

Satisfactory observations in these regards can not be accomplished without the aid of law. The spontaneity of the individual does not lead him to guard against the ascertained sources

of ill health. Even if circumspect and informed himself, he can not apply the facts to the case of his neighbor. Yet in no other line is the mistake or carelessness of the neighbor so apt to tell upon the adjacent household. Many of the evils are of that nature that they attach to no one vicinage, but are such as relate to an entire street or water course, or section, or to some great highway of conveyance, and must have legal regulation. Much, too, of the value of law in these regards is that it is informatory and educational, far more than it needs to be compulsory. The reports of the English Health Board for the last twenty years have by the diffusion of intelligence done far more for the benefit of public health than have any penal enforcements to which they have given rise.

Large and telling facts have been elucidated, and the press has been engaged until sanitary papers are as common in the London Times as the reports of educational or literary associations. One is even surprised at the intelligent lay discussions found in numerous journals as to local and general health interests. The necessity of law thus comes to be recognized so that what otherwise might be regarded as a trespass upon private rights is welcomed as an offshoot of that olive branch of protection which extends peace from pain and deliverance from death, and so gives to the citizen ease instead of disease.

Law, to say the least, is bland and beneficent and conservative when, in such a noble work, it is no more aggressive than that under which this board is organized. It has asked no attribution of power and seeks no jurisdiction such as that which often needs to be conferred on local boards. Its sphere is to collect and present each year the best ascertained evidence there is as to preventable causes of disease, as to the effects of localities, employment, conditions and circumstances on the public health, and to diffuse it in such practical form among the people as shall add to popular information in these regards.

It will be necessary for us to inform ourselves as to any local causes of disease or as to the course and circumstances attending any epidemics that may invade our State, and by correspondence and observation to seek to assure ourselves of the connection of any existing or abatable evils with such sickness or mortality as may occur. In this we will, no doubt, at times need to invoke the aid of local authorities, and especially the aid of those

who, as medical practitioners, are most observent of the state of public health.

Our experience has been that some of our most reliable physicians, as well as various laymen, such as teachers, druggists, chemists, engineers, et cetera, are responsive to such requests. We think we shall not fail in the securement of a valuable amount of reliable facts and careful opinions.

It will also be well for us to look carefully at all existing laws bearing on public health and after all those defects in legislation which might be supplied without infringement on any individual rights and to the advantage of all. As such suggestions would come before the legislative and executive branches of our State, they would have only that force of advocacy to which clear facts and open arguments might entitle them, and are in no danger of being prematurely enforced.

It will naturally be our aim to seek the aid and co-operation of all local boards, not so much expecting to enlighten them as that they, in the common interests of sanitary knowledge, shall acquaint us with all local facts bearing on health interests, and so enable us, by the collection and presentation of the records of various localities, to render available to our citizens at large the information which cannot be equally serviceable in any other way. A misapprehension of the design of such boards led to a clause in this bill which was intended to restrain its jurisdiction over cities or local boards of health. It is already understood by most of the city boards that no jurisdiction is aimed at or provided, and that, in order to an intelligent presentation of the interests of the other districts, a knowledge of local and aggregated population is needed. We doubt not, with the urbanity of citizens and the devotion of local sanitarians, they will unite with us in conserving interests so far removed from partisanship and so vital to the people of the State at large. It is chiefly by the co-operation of local authorities and of those whose professions and fields of observation direct their attention to health matters, that we are to hope to render most effective co-operation for the physical welfare of the people.

Very many subjects will readily suggest themselves to the members of our board, and it will require much thought so to outline and conduct our work, both of investigation and of imparting information, as to lead the people and our rulers to in-

telligent conviction of what is needed, and to such action as shall be spontaneous and acceptable.

For several years many of our most thoughtful citizens have realized that there was call for a more extended presentation of the interests of public health. Our relations as the great highway to, and as the suburbs of, large cities makes us especially exposed to epidemics, without the protection which great cities are apt to provide. Nuisances expelled outside of city limits are sometimes thrust upon us, which have, in many cases, led to serious results. Our able State Geologist and others have set forth the evils caused by drowned lands, and the advantages to be had in some parts by improved water supply. Statistical defects have been to some degree recognized, and cities like Newark and Paterson have perfected methods of their own.

Our board commences its labors at a most opportune time. In our own country and abroad for the last two years there has been an unusual awakening to the interests of public hygiene, and to the necessity of the fostering care of the State therefor.

There is a large accumulation of facts and of principles to govern us in our work, and a literature rich in illustration and evidence of the practicability of sanitary administration.

I may thus, while declining to be other than your temporary chairman, be permitted to express the congratulations of each one to the other that it is our privilege to labor together in a field in which there is more of usefulness than of reward and more of labor than of honor.

The best acknowledgment we can make to the honorable Legislature which has passed this law, and to his Excellency the Governor, who has honored us by associating us in this work with members of his staff, is to faithfully detect and expose the evils which burden the public health, and impart such information as shall guard against avoidable invalidity. So in our sphere, by contributing to the welfare of our fellow citizens, we may seek to honor God in serving mankind. With these remarks, I beg to announce that the board is organized sufficiently to proceed to business.

The board was then permanently organized by the appointment of Elias J. Marsh, M. D., as President; Ezra M. Hunt, M.

D., as Corresponding Secretary, and E. A. Osborne, C. E., as Recording Clerk.

The board proceeded to a consideration of those subjects which most urgently seemed to call for their attention.

As only about six months would elapse before the first report is required to be rendered, it was thought best to study and outline the work to be done, rather than enter at once upon an extended series of investigations.

The following subjects were chosen and committees appointed to make thereupon preliminary reports:

On registry of Births, Marriages and Deaths—Messrs. Kelsey, Marsh and Bodine.

On the duty the State owes to children as to their protection from impairment of health in the Home, at the School and in the Workshop—Messrs. Hunt, Dennis and Brackett.

A brief summary of directions to families as to the more common domiciliary influences and surroundings productive of disease, and the means of detecting, neutralizing or preventing the same—Messrs. Ridge, Osborne, Taylor and Marcy.

A brief statement of endemics or epidemics that have occurred since 1870 in the State, and their causes, so far as ascertained—Messrs. Varick, Culver and Gauntt.

A brief paper of information which shall point out such localities in the State, as from their topographical and geological position and condition, stand in special need of sanitary improvement—Prof. George H. Cook.

A statement of the climatology at various points in our State for five years past, and of diseases apparently dependent thereupon—Messrs. Brackett, Osborne and Dennis.

The diseases of animals, although not placed in charge of a committee, were directed to be inquired into by various members, and the Corresponding Secretary directed to collect information as to any epidemics that had occurred within the last five years, as preparative to further investigations.

The secretary was also directed to secure a codification of all laws bearing upon or relating to State hygiene, which are to be found on our statute book, and to furnish a list of the same to facilitate reference. The papers which have been prepared by these several committees, will be found to be a valuable part of this report.

Many other matters of sanitary interest have come before the board at its various meetings, but it is not thought necessary to report to your excellency, details, except so far as they relate to the present outlining or execution of work.

VITAL STATISTICS

The first subject to which your attention is invited is that presented in the paper on vital statistics.

It has not been considered by the committee necessary to reason in detail the necessity which exists for a careful registry and return of the births, marriages and deaths in every State and city. Our State was among the first to settle that question by a definite effort in that direction. The improvements made in the methods of studying and tabulating such records, the greater knowledge of the course and causes of disease, the results attained from the systems already adopted in many countries, the necessities of such tables for the study of the laws of population and of life insurance, and the ability which has been shown to limit epidemics, to prolong life, to prevent outbreaks of contagions, and even to abate crime, by the study of these vital tables, has undeniably attested their indispensable importance. As they indicate the rise and ebb of population, the laws which govern it, and the best legislative methods of conserving the interests of the citizen, these results are sought by the political economist, not less than by those who seek to know the science and the art of preserving life. All arguments which obtain for the procurement of any census returns, apply with more force to these than to any other, because they embody more of the objects of a census than any other class of statistics. Our error as a State has not been in entire neglect, but in a failure to change and improve the law, and to bring it in accord with more modern and perfected systems of return. Our present law is not only that of 30 years ago, but even that is mostly a copy of the original law of the eighteenth century. Since then such has been the increase of knowledge as to the interest and significance of statistics, that present methods have become impracticable and misleading.

The chairman of the committee herewith presents his report and advisement as to desirable changes. The New Jersey State

Sanitary Association has also had two papers before it, in which the subject has been well examined, and other facts adduced to which reference may be had. The State Board of Health is carefully considering the whole subject, and will necessarily recommend some change in the present inoperative law.

The report on the duty which the States owes to children in families, schools and workshops, will this year deal only with the home and the school, reserving the relations of the State to children in factories for another year. This report recognizes the child as, to no small degree, the ward of the State; since from five to eighteen years, he is taken under the charge of the State for education. It is all important as a great public and social interest, that we should avail ourselves of such information as to methods and surroundings as will fully carry out the object of free school training. This report seeks to present some of the various evils to which the child is exposed, in order that the attention of parents and citizens may be directed thereto for their abatement. Some of the more important means by which improvements are to be effected are stated. Also some of the readier tests are given by which unsanitary conditions of air, water, heat, etc., may be detected. The whole subject is one of such vital interest to the growing population of the State, that it will commend itself to your careful thought and inquiry.

The report as to the "More common domiciliary influences and surroundings productive of disease," does not attempt to consider all household conditions hazardous to health, but in this, the first report, fastens attention on the evils of defective ventilation and impure water supply, as introductory to a fuller consideration of methods of improvement and of other sources of ill-health which are very apt to occur in household administration, and especially in the close vicinage of cities. It deals with subjects of practical interest to all that dwell in ceiled houses, and thus addresses itself to the consideration of every citizen.

The report on endemic and epidemic diseases in this State since May, 1869, is a summary of all the best information that can be obtained upon the subject. In the absence of any State Board of Health, or of any reliable system of vital statistics, the only dependence has necessarily been upon the reports of medical societies. These are of great value so far as they go, but as

in all purely medical reports more attention is given to the detail of symptoms, to the ways in which separate organs are affected, and to the methods of treatment, than to causes and the methods of prevention. It was, however, thought best by the board to collect all information possible as to endemics and epidemics for the last septennary period. This is introductory to that more strictly sanitary study of causes, of surroundings, of the laws of infection and contagion, which is so important in order to ascertain the most feasible methods of prevention or limitation. The details here given have, therefore, interest for future comparisons, and as points of departure for systematic sanitary analysis. It will be found in the report that soil moisture or imperfect drainage is well recognized as causing fevers and other diseases of an intermittent or miasmatic type. The malignant malarial fever localized in a certain suburb of Trenton in 1871, is instructive as showing how a miasmatic influence may be so intensified as to produce a type of the fever almost as pernicious as the yellow fever of the tropics.

The decline of intermittent and remittent fevers in Camden and its vicinity, as the result of effectual drainage, has been so marked as to corroborate manifold experiences of the same kind in other States.

The report discusses the sanitary effect of salt marshes, and the subject is one needing further inquiry. It will be seen that this report does not deal with developmental diseases, or those dependent on imperfect nutrition, but chiefly with zymotic diseases. These usually depend upon outside contagions rendered active by unhealthy surroundings, and by the susceptibility of the persons affected, both of which we believe can be greatly modified. It will be noticed that the chief endemics or communicable diseases confined to some one locality have been typhus fever in 1870 in Jersey City, and one each of cerebro-spinal meningitis, puerperal fever and erysipelas Typhoid fever while endemic mostly, has at times almost seemed an epidemic.

Epidemics of measles, mumps, whooping cough and influenza have from time to time occurred. But the three prominent pestilences in the State for the period since 1870 have been diphtheria, small-pox and scarlet fever. Diphtheria has been epidemic in at least twelve counties of the State in a single year (1876), and has at other times prevailed more or less in various

localities. It is as much under the control of preventive and sanitary as it is of purely medicinal treatment.

Small-pox, in the same period, has numbered as many as one thousand cases in a single year in one city. Most of our larger cities on lines of public travel have had it prevalent or epidemic at various times. In Camden it preceded the fearful scourge of Philadelphia in 1872. A mortality of 37 per cent. among those not vaccinated is stated. It is a disease often met with in country localities, as well as in larger cities. A distinguished writer, who is not a theologian, has said that the perversity of mankind in neglecting vaccination, which is so sure a protection against fatal attack, is the most available argument in proof of original sin. Now that vaccination directly from the calf can always be secured, the old excuse of the possibility of catching skin diseases from other people's children, which has been greatly magnified, has to be laid aside. Our State is so much a highway of travel that it is greatly important that all proper means be used to secure the vaccination of adults when the epidemic prevails. The contrast between such cities as Providence on the one hand, and Philadelphia on the other, shows what a difference in the prevalence of the disease can be made by an efficient system of vaccination. It seems to us, it is one of the rights of the citizen to be protected from such exposure. When, as in our State, the child has the gratuity of the free school, it is scarcely a question but that his vaccination should have been attended to before he is placed in a position by which he may unnecessarily become the conveyer of a disease which jeopardizes the rights of all the rest of the school.

Scarlet fever, which is so often epidemic in different parts of the State, is greatly influenced as to its spread and malignity by hygienic conditions, and is, therefore, very much under the control of sanitary jurisdiction.

In reference to this and all other diseases known as zymotic, the bearings of the pollution of air, of water and of habitations and of personal cleanliness thereupon is so definite that our highest authorities agree in calling them filth diseases; not that they may not occur amid good sanitary conditions, but if so, it is because they have been warmed and nurtured into virulency amid favoring circumstances. Even where these diseases occur, we greatly modify them by well applied hygiene. It is

maintained, too, by some of us that in the case of persons exposed to these contagions, much is to be done by their preventive treatment in advance of the time for the manifestation of any symptoms.

The paper on miasmatic diseases in Hudson county clearly presents the atmospheric and telluric influences in the county, which seem to favor the prevalence of intermittent and remittent fevers and to give to other diseases a miasmatic type. While all of us may not attribute the result so entirely to the extreme moisture, yet this is no doubt one of the factors in the causation of miasmatic disease. The views presented will aid in the study of that large class of disease which has its origin outside of the body, and which therefore is to be searched for with eagerness, either that it may be abated or that exposure thereto may be avoided.

The board also requested from Prof. Geo. H. Cook, the State Geologist, a brief statement as to any extended localities in which geological structure or surface conformation gives rise to imperfect drainage, or to any other circumstances which might jeopardize the health of the individual.

The study of the earth's surface, both as to its topography and its geological structure, is telling us much as to the conditions which favor heat or cold, moisture or dryness or sudden changes that may take place both in telluric and atmospheric conditions. Great water basins dependent upon impervious rock below the surface, while the crust of covering soil seems high and dry, sometimes account for intermittents in localities apparently free from miasmatic causes. Minerals in the water or the soil and the character of vegetation have much to do with normal or abnormal decomposition and decay. Water supply for drinking purposes is greatly involved in questions as to clayey, gravelly or humus soil. So, very many other questions as to health, require a knowledge of the earth's structure. The study in this State is all the more inviting because faithful and able service has so well defined its geological structure, and because the great geologic formations are so distinct. Perhaps in no State of our Union is there such encouragement to the study of population as affected by location. The triassic or red sandstone formation occupies nearly the whole of 9 or 10 counties. The cretaceous formation, including the green sand marl beds,

has its long and narrow belt adjoining, giving character to consecutive parts of eight counties more. The tertiary or more recent formations of Southern New Jersey cover six counties and parts of four others. Thus, in all but a small portion of the State, geologic structure can be studied in its bearings on air and water, moisture, disease, et cetera, without the complications which occur from frequent overlappings and intersections. The azoic and paleozoic or primitive formations, including the iron ore and limestone districts, in the northwest portion of the State, intermingle, but the other three formations already noted "are so entirely distinct from one another that they can easily be drawn in separate maps." Our geology, our locality, our minglings of city and country, our distinct sea and mountain districts and all as related to disease and climatology, so invite attention and investigation, that an eminent American sanitarian recently said to us that he considered New Jersey as the best locality in our Union in which to study those sanitary problems which most concern the civic welfare of the American people.

This year as preliminary we have only asked such indication of localities especially needing attention as have been brought to notice in the course of former surveys. We commend this paper to the notice of all interested in questions of drainage and public health, as indicating an important State interest.

Akin to this will be found a report upon the climatology of a part of the State for the last five years, as will be needed for reference when we come to secure future records, and to associate them with reliable statistics as to the progress of disease, and the ratio it holds to heat, moisture and to telluric and atmospheric conditions.

In this report it was not found feasible to make such comparisons, as so few even of our cities have attempted mortuary tables, and as other essential factors are absent, so that the data are insufficient in details and in extent of observation.

It had been the intention of the board to have furnished a careful statement of the diseases of animals for the last five years in this State, in order to show those to which experience had indicated us as most exposed, and for the purpose of pointing out methods of isolation, precaution or prevention. As there have been only sporadic cases of such diseases, as no one seems to have tabulated with accuracy the number of cases, and as the exact

diagnosis of the disease is seldom verified by skilled veterinarians, it was found that such information would have in it little if any practical instruction. It is our hope to secure, from the very few educated veterinarians and from the leading stock proprietors in our State, such facts as shall hereafter enable us to give intelligent notice of this branch of health interest. It is well for our citizens to know that the diseases of animals and their modes of prevention are being carefully studied in all European countries and in our own, as a part of sanitary science, and that veterinary practice is securing to itself exactness of diagnosis and of treatment quite in keeping with the progress of medical knowledge. Animals in our own country suffer greatly from a kind of promiscuous prescribing, little better than guess work, and diseases are spread or fostered which might easily be limited. It is important that the people generally should recognize the health of animals as essential to the productive energies of the State, and to the food material of its inhabitants, and also that many of the laws as to food, ventilation, isolation from contagion, and cleanliness are applicable to them as well as to the higher animal, for whose comfort and sustenance they are provided.

CORRESPONDENCE OF THE BOARD.

The board has initiated correspondence with boards of other States, and is availing itself of the best information it can obtain, as to the more pressing and vital interests of sanitary improvement. It has also been invited to some foreign correspondence, and has answered inquiries presented to it from abroad in reference to the great interests of public sanitation.

In our own State the board, by a circular issued in June last, placed itself in correspondence with persons in various parts of the State, who were believed to be best informed as to local impairments and needs, relating to health. A special circular was also addressed to city boards, so that we might obtain from them such information as would aid in our general work. It appeared that some of our cities had no organized boards of health, and in others they were acknowledged to be inoperative by reason of lack of interest, of information or of defined authority. From most of the cities which have boards of health, we received

kind and co-operative response. The board has not yet entered upon a plan of systematic and tabulated inquiry as to diseases and their causes, as the work preparatory to this is more important just now, and needs to be well conceived in order, in due season, to be well executed.

The labors of the commission of 1874 and the two reports of the New Jersey Sanitary Association accessible to us, together with some reports and other documents of State and county medical societies have enabled us to form such estimate of the work to be accomplished as to make it unnecessary to repeat such preliminary work until local boards are more fully organized, or sources of error which now jeopardize responses to inquiries and inaccuracies which admit of remedy are more carefully guarded.

Soon after the first meeting of our board we were addressed in reference to a nuisance, which had arisen in one of the villages of the State from the accumulation of large quantities of milk in vats. A factory for the condensing of milk had been established, and after running for some time and accumulating a large amount of unused material, the business failed. About 5,000 gallons of milk were left on hand at a season of the year in which it soon underwent fermentive and putrefactive change. The proprietors secured a number of hogs in order to dispose of the material. This, while gradually diminishing the quantity, did not abate the nuisance. The stirring and mixing of the mass, in order for its disposal, really increased the evil. The corresponding secretary, after apprising himself as to the facts, presented the merits of the case to the chief proprietor, who seemed not to have realized the unsanitary character of the nuisance. Although this did not lead to as speedy relief as could be desired, it hastened the efforts to remove the offense. By appointment of the board, a committee then visited the place and gathered from the nearest physician and others such facts as were relevant. The evidence afforded to the committee, not only of the reality of the nuisance as afflictive to the senses, but also as detrimental to health, was convincing. One lady had suffered a serious illness which had necessitated her removal, and which was certified by an intelligent physician as caused by the spoiled milk and the pens. Others in the neighborhood had suffered from consequent diarrhœa and from that feeling of dis-

comfort which often occurs from impure air charged with organic matters, even when there is no pestilential outbreak. We think the citizens of that town are to be congratulated that serious consequences were so limited. Said one of the proprietors to us, "I never could have believed that milk curd could smell worse than carrion." This filthy mass, decomposing under a summer sun and filled with maggots of various proportions, found its way into hogs, which were killed in September and sold for pork of doubtful salubrity. The proprietors had no evil intent, but by a want of apprehension of the risks to health, and from anxiety to save further monetary loss, they jeopardized the interests of others. It was an illustration of that class of cases liable to occur anywhere, in which some local authority should have power to adjudge a nuisance and to cause its abatement, if so immediately prejudicial to public health as to require summary attention. Such a case as this cannot be met by the usual grand jury presentation, as there is no sitting during the summer solstice, when such exposures and when epidemics are most likely to occur. Authority for the summary abatement of threatening sources of disease in cases of actual and present peril admits of safeguards, and is not more likely to invade personal rights than any other kind of authority conferred in the interests of the common rights of society. It is often the misfortune of defective sanitary legislation that even epidemics are permitted to get headway, when a right exercise of conferred authority at the right time would have limited the contagion. The last outbreak of yellow fever at Memphis was a signal instance. In our own State we once saw a thickly populated village subjected to cholera contagion, and the township authorities appealed to in vain, not because of want of interest, but of want of jurisdiction. We have reason to believe in that case a serious outbreak was only prevented by the courage of a physician who, in his own name, took possession of soiled garments and beds and burned them.

It has generally been the misfortune of liberal governments that they leave legislation to deal with accumulated and direful results, rather than with the abatement of causes. Thus the severity of the law which afflicts or punishes, supersedes the blandness of the law which prevents. This milk nuisance to which we have alluded, occurring in a retired and unexposed village, is an illustration of how easily or how undesignedly an

evil may spring up in localities least anticipated, which can be met by proper and well defined statutory limitations, and also of how much need there is of the diffusion of such intelligence as will lead to the entire prevention or speedy abatement of such nuisances.

WATER SUPPLY.

The Board of Health has been appealed to in the case of the interruption of a water course in Warren county, by which, it is alleged, the water of a town is deteriorated and sickness results. We have not as yet been able fully to investigate the facts, but have placed them in the hands of a competent engineer for inquiry. If it is found that there is real peril to health, we shall hope to be able to persuade those concerned to furnish such means of restoration as may be indicated.

The whole subject of the water courses of our State, both as relates to their availability for the furnishing of pure water, or as open sewers or carriers of the pollution of cities, is one well worthy of the careful attention of our citizens. Our cities and our densest population is distributed along water courses, under modifications arising from the proximity of New York and Philadelphia. Tide water and great tracts of salt marshes in the north, and the sand deposits of the south, introduce other correlative factors. The questions of water supply and sewage and river contaminations must be studied in view of the great present and prospective massing of populations on the red sandstone and cretaceous tract and adjacent to great alluvial deposits. Some of these problems, as is well known along the course of the Passaic, have become complicated already. Others can be much more readily and economically solved by being comprehended now, before greater obstructions and increasing disabilities embarrass the solution. It is our hope in another year to discuss more fully the whole subject of water supply, both as it relates to cities and to country districts. We thus allude to it here because we would have our citizens on the alert beforehand in inquiry as to the vital range and critical significance of its wise consideration.

ODOR FACTORIES.

Our attention has also been drawn to the proximity of offensive factories, slaughter houses and dumpings, and collections of filth to which a portion of our State, by its position, is much exposed. At one point from 12,000 to 18,000 hogs are often killed weekly, and besides large quantities of offal are brought from another point to this, for rendering. Factories for dealing with refuse material send abroad their noxious ordors over the wide plains between the Passaic river and Jersey City, and it cannot be denied that the air in summer, and sometimes in winter, is so charged with organic matters as to render it intensely offensive. The refuse of cities is in some cases so gathered upon the outskirts, as to cause present nuisance, which will be rendered permanent and scarcely less hazardous when it comes to furnish the building ground for future dwelling houses.

On some accounts it is not necessary to discuss the question whether bad odors are necessarily harmful. In other countries, law has already decided that smells which inflict discomfort upon society at large, and odorless smoke when poured in such volumes into direct contact with populations as to be afflictive, if it can be remedied, must be on the general principle that whatever unnecessarily and intrusively interferes with the public comfort of large masses, may become a subject for legal enactment. Gladstone has specified poor water, foul air and smoke, as the three prominent nuisances of cities.

It would seem, as thousands are necessarily brought each day within the tainted and offensive air of many of these establishments, that at least the greatest effort should be made to prevent these sickening smells. An eloquent lawyer of our own State recently, in glowing language, described to us the personal infliction to him and to very many whose complaints he had heard, and his sense of mortification that the multitudes passing to and fro through our State, should be subjected to such annoyance. A prominent railroad official who has for long years studied the effect of scenery, of bridges and tunnels, of foul air, and of various conditions and circumstances of travel on the choice of routes, and the comfort and satisfaction of passengers, avers that these matters much concern the inclination of people to tarry in a State, as well as the interest of a company as carriers. In these

instances, the usual argument that those who object should not move to the vicinity, cannot apply, for the roads were in possession before the nuisances, and, besides, the fair presumption is that land near cities must be occupied for human habitations as well.

But the chief point for us is to know how far these bad odors are injurious to health, and so to seek their abatement if indicated on this ground.

While it may not be possible to analyze each individual stench, or to assert that each and every unpleasant odor is harmful to health, yet the general fact remains undisputed that all gases of decay are contaminations of pure air and were not intended for breathing purposes. They give rise to general malaise or to deterioration of vital force. Depression of vigor occurs to some, others have only disbursing mental impressions, which make reasonable discomfort, while the weaker or more susceptible suffer from direct disorder of vital functions. It is not necessary to show that many are permanently injured, but if some have vital impairment for a time, if to others they are the exciting cause of sickness, and if occasionally they prove the fertile hatching-place of endemic or epidemic diseases, such occupations should have brought to bear upon them all the safeguards which science and art have devised. The sudden outbreak and excessive mortality of cholera in 1866, at one of our poudrette factories, was only an illustration of what sanitary observers well know, viz: that filth, although not always the originator of disease, and not always explicable as to the laws of its fertilizing agency, is, nevertheless, as great a promoter of existing disease as are certain artificial manures when applied to various crops, the seeds of which they have no power to originate; nevertheless, they impart rankness, and in some cases seem so to introduce new orders and species, as to imitate or initiate what is equivalent to original production. Facts, too, as to the courses of disease in localities which have been built on organic ground material, now prove to us that such material is unfit for the location of house structures for many years.

We do not claim that factories, or other smell or smoke nuisances, should be prohibited, or that they should be suspended from work by any too summary legislation. But we do claim that public opinion should be respected in condemnation

of these unmistakable nuisances, that their proprietors and others should come to appreciate that they are hazardous to the rights of health by reason of their gases of decay, and that the most scrupulous efforts should be made to prevent offense or danger.

The member of our board who visited the slaughter houses on the Hackensack was in every way treated with courtesy and a desire shown to secure cleanliness and to prevent foul odors. But there was not evidence that the best methods were in use for dealing with decompositions or for deodorizing the immense volumes of smoke which pour their decay-laden gases into the nostrils of so many persons who cannot recognize that thus the breath of life is inbreathed.

The great mistake generally is that effort is made to burn up and to carry off by fire and smoke some gases of decay which are not inflammable and which must be passed through water or submitted to some process of chemical absorption. This often adds to the expense, but not to a forbidding extent. Whether from a want of knowledge or from an unwillingness to incur expense, we do know that all these offensive establishments should be compelled to adopt such measures as shall abate these nuisances. The various experiences as to gas and factory and smoke nuisances, which have occurred from sanitary legislation abroad, and abundant instances afforded by the State and city reports of our own country, furnish abundant and guiding facts and literature upon this subject. On the basis of these we can now only affirm that these odors can either be entirely removed or very largely mitigated, if only it is required that the best devices for their prevention be in use. The presence of some of them in our midst is to be accounted for by the following extract from the report of the Board of Health of New York City: "In addition to the various kinds of business connected with the slaughtering of animals which, if carelessly or improperly conducted, are liable to be complained of, the attention of the board has been called to other manufacturing pursuits located in the crowded parts of the city as being detrimental to the public health. Among these may be mentioned, all factories emitting large quantities of smoke, which enters the neighboring tenements and is injurious to the weak and invalid, if not to those in health, and which deprives the inmates of fresh air and

compels them to keep their doors and windows constantly closed. As it is a fact well established in older cities that this nuisance can be abated at small expense, the board has adopted an ordinance that, from and after the first of June, 1870, every furnace employed in the working of engines by steam, or in any mill, factory, printing house, dye factory, gas house, etc., * * shall be so constructed as to consume or burn smoke arising therefrom, unless a permit to the contrary be obtained from this department." The deodorization of non-combustible gases deleterious to health admits generally of successful accomplishment. In both cases much depends, not only on the scientific methods and apparatus used, but upon the intelligent oversight of skilled and faithful workmen.

FOOT TRAVEL ON RAILROADS.

The evils arising from the use of our railroads as foot paths, has invited our attention. At the instance of a member of our board, our most prominent railroad company has kept for the last two years a record of all accidents happening on their lines. What was recognized by experience is now demonstrated by numbers. Very many of the accidents by which lives are sacrificed arise from the use of the railroad track by tramps in their wanderings from place to place, or by others for convenience in passing to different streets. Life is thus jeoparded, the unpleasantness of mangling accidents is forced upon the public eye, and sometimes other liabilities of accident are involved to passengers. We believe that it should be made a punishable offence to walk thus on railroad tracks, or at least in the case of those roads running more than a specified number of trains each day.

CLIMATOLOGY.

The board is about instituting a uniform system of meteorological observations, in order the more closely to study the bearings of climate upon health. At present the most valuable records are those of the Hon. Wm. A. Whitehead, of Newark, and he has kindly furnished to the board valuable statistics for the last five years, which are herewith presented.

To facilitate easy reference to former health legislation, a brief

codification of laws not repealed will be found at the close of this report.

Other subjects have come up for discussion before the board, to which in this initial report it is not necessary to allude. No one who surveys the range of sanitary science and its appliances but that recognizes the breadth of the field to be studied, and the variety of objects with which it teems.

It is gratifying to know that already many of our most intelligent and progressive citizens are alive to the imminent interests which are involved in these great health questions, and of their bearing on questions of social progress. Beside the labors and writings of members of the State Board, we may be said to have a valuable and increasing literature upon these subjects. There are papers and addresses by Prof. Geo. H. Cook, of New Brunswick; Prof. N. R. Leeds, of Hoboken; Prof. H. R. Cornwall, of Princeton; Superintendent Pierce, of New Brunswick; Dr. J. W. Pinkham, of Montclair; Dr. J. L. Bodine, of Trenton; Dr. H. A. Hopper, of Hackensack; Ashbel Welch, of Lambertville; L. B. Ward, of Jersey City; Col. R. S. Swords, of Newark; Rev. F. R. Brace, of Blackwoodtown; Hon. Wm. A. Whitehead, of Newark, and others, on the subjects of water supply, sewers, purity of air, influences of soil and climate, the causes of insanity, the hygiene of schools, and other matters which promise careful future study and show an intelligent apprehension of the vital concern which the whole science of sanitation involves.

It may be well for us to say, in conclusion, that the board enters upon its work with definite views as to its sphere of inquiry and of actual service.

First of all, it behooves it to become the repository of the best information to be obtained from all available sources both as to the condition of public health and as how far these come under the jurisdiction of State or local authorities. Next to its value as diffusing information among the people, it may be of great service for expert evidence as to questions of health interest which unavoidably come before the State authorities, and upon which they have need to ask for responsible and sustained information.

In some of the States, State Boards have been used with great advantage as references in cases where local board administration was resisted. A State Board has opportunities of acquainting itself with the domain of law, the limits of authority, the desirable equipoise of public and private rights, with impairments

and jeopardies to health from special causes, such as cannot be secured by any one local authority, and may often be of great advisory service. Besides, the great value of local sanitary administration is greatly constricted, unless, by a massing and comparison of the experience of localities, the whole is made available through some central bureau for public service.

With the exception of some legislation so long felt as needed in reference to vital statistics, the board has little to suggest as to legislative enactment. Some general law is ere long desirable, empowering local boards in townships as well as in cities, but this can await until there shall have been wise forethought and advice. It is our desire always to secure public sentiment, or to be able clearly to command representative authority before asking legislation. Even then our only sphere is that of wise suggestion. Time and study will yet develop how valuable to a State the services of such a board may become.

While for the present half year we have been engaged on preliminary work, we shall hope in due time to draw particular attention to existing defects and to remedies, and so to study the avoidable causes and incidents of restricted vitality as to aid in lessening the incubus of disease and death upon the population.

We submit to your Excellency, as a part of this report, the studies, observations and information which the members of the board have been able to secure on matters that intimately concern the public welfare in their sanitary bearings, and as herewith presented in special papers or reports.

ORDER OF PAPERS AND REPORTS.

I. Registry of births, marriages and deaths.

II. The protection of children from impairment of health in the home and the school.

III. Some of the more common domiciliary influences and surroundings productive of disease.

IV. A paper from the State Geologist as to localities, in which topographical and geological position and condition indicate need for sanitary intervention.

V. Endemics and epidemics since 1870.

VI. Climatology.

Codification of Laws, Index, &c.

Report on Vital Statistics.

BY E. J. MARSH, OF PATERSON.

It is unnecessary at this period to enter into an elaborate argument proving the importance of an accurate registry of all births, deaths and marriages, occurring in the State, as the value of such a record has long been recognized by our legislators, and laws have been passed at various times to regulate and carry out such a registration

The chief purposes of this registry are:

1st. To establish a record of the events, as a sure reference in certain cases where the rights and claims to property are concerned.

2nd. To ascertain and illustrate the social condition of the people and the changes it may undergo.

3rd. To ascertain the rate and causes of mortality, a knowledge of which is a necessary basis for a systematic improvement of the sanitary condition of the people. This last purpose will be principally considered in this paper.

In 1798 a law was enacted in this State requiring the clerks of townships to keep the proper books and record therein any marriages, births or deaths which might be reported to them by the persons interested. Such a record from voluntary application would necessarily be very incomplete, and useful in only a few exceptional instances. In 1848 another law was passed intended to remedy these defects, and enlarge the benefits of the registry. This law required all clerks of townships to find out and record all the births, marriages and deaths occurring within their respective districts, and to transmit annually to the Secretary of State a copy of such record. The Secretary of State was then to have the records analyzed and tabulated so as to bring out all the important facts and make a report of them to the Legislature. The duty of collecting the facts was subsequently transferred from the town clerk to the tax assessor, and with this

and a few other unimportant modifications the law continues at the present time. The births, marriages and deaths are collected annually by the tax assessors, copies of the lists made by the town clerks and transmitted to the Secretary of State, under his directions tabulated, and the result published by the Legislature. Thousands of dollars have been spent in carrying out this law, the various fees and expenses having of late years been over 11,000 dollars.

These records having been preserved and published annually for nearly thirty years, it might naturally be supposed that an ample fund of valuable information was at hand either to establish individual facts, or to ascertain our birth and death rates, and the various causes of disease prevailing in the State. In point of fact, however, they have not been and are not now of any use whatever; as references they are worthless and inaccessible; as indications of our present and past social and sanitary conditions utterly misleading and erroneous. The only useful purpose they can serve is to indicate the inefficiency of the present law, and tell us what not to do.

These assertions and charges may be considered too sweeping, and proof of them may be asked. If so it is easily given by looking into the practical results of the registry. Here it is found that: 1st. They are inaccessible as individual records for the reason that the names are not indexed but recorded solely in the order in which they have been taken by the assessor. Hence to find the evidence of the birth, marriage or death of any one person, search must be made through the entire register perhaps of some thousand names. 2nd. They are incomplete, not slightly so, or with a few omissions, but a very large proportion is left out. This is only in accordance with other experience. The vital statistics of the country were collected after a similar plan for the last United States census, and the superintendent of that census estimates a deficiency of over forty per cent. in the number of deaths reported. This is accounted for partly by the carelessness of the assessors or census takers, partly by forgetfulness on the part of the persons questioned and by various other reasons. Our State reports may be a little fuller, but still are very incomplete. Sometimes the assessor makes no return at all. In the Secretary of State's report for 1875 it is stated that from 32 townships no reports of deaths had been received.

Where reports have been received, sometimes more than half the cases have been omitted. An examination of any of the annual reports will show these deficiencies, but a few examples will suffice. They will be drawn from the registration of 1875, for the reason that a State census of inhabitants was taken in that same year, and the mortality rate can easily be calculated. For the whole State the mortality rate was 13.6 per 1,000, a figure so small as to throw suspicions on the correctness of the returns. In the State of Massachusetts the rate was 19 in 1,000.

A comparison between some different counties and towns will show remarkable differences. In the northern part of the State, Passaic county, with a population of 53,775, has a mortality of 1,221, or a rate of 22 deaths in every thousand inhabitants; Sussex and Bergen counties are immediately adjoining. The former has a population of 24,010 and a mortality of 231, or 10 in 1,000; the latter a population of 35,516 and a mortality of 330, or 9 in 1,000. These two latter counties show a mortality rate so small that the returns may be determined to be certainly incorrect, and this to such an extent as to render them worthless for sanitary investigations.

These instances are by no means exceptional, and the same state of affairs is found in many other counties. Monmouth reports a mortality of 6, Somerset 7, Warren 8, Hudson 9, Mercer 10, in 1,000 inhabitants. The only counties returning even a possibly correct mortality are Passaic, with a rate of 23; Essex, 22; Union, 28; Cape May, 16, and here undoubtedly many deaths have been omitted. These deficiencies are found in all parts of the State, both in rural districts and in large cities. In fact, the greatest difference appears in the case of cities, in some of which there is the merest approach to accuracy, and in others the most complete departure from it. Hoboken, with a population of 24,706, has a mortality of 728, or 29 in 1,000, while Jersey City, with a population of 104,227, returns only 774 deaths, or 7 in 1,000; or in other words, Hoboken is represented to have almost exactly as many deaths as Jersey City, which has four times the number of inhabitants. Elizabeth and Trenton have each about 25,000 inhabitants, and while the former is reported to have 746 deaths, the latter has 235, or not one-third as many.

These examples will suffice to show how incomplete and unreliable the returns are as matters of record, and how utterly

valueless and misleading for the investigation or illustration of the sanitary condition of any given district.

If, then, there is such difficulty in obtaining a mere enumeration of the number of deaths (facts which require no special intelligence or education to ascertain), it might be reasonably expected that a record of the particulars of each case would be still more full of errors, as this calls for more attention, exact memory, and even special knowledge. Among other particulars, the law requires a record of the age and cause of death. The age is generally known at the time of death, but after the lapse of a few months the exact number is forgotten and an approximate age is fixed Thus assessors and census collectors find that the round numbers give more cases than those immediately adjoining—20, 30, 40, 50, &c., show many more than 19 and 21, 29 and 31, &c. In many cases the age is not reported at all. The greatest difficulty, however, occurs in fixing the cause of death. This is a purely medical matter, and can only be determined with accuracy by the physician. The parents frequently do not know or remember the statement of the physician, and utterly erroneous returns are made, and every death is referred to some well known malady; all wasting diseases become consumption, all sudden deaths heart disease, and all infantile deaths cholera infantum or convulsions. In over eleven per cent. the cause of death was not reported. Such returns are necessarily utterly unreliable and valueless to the sanitary statistican. No one can study the cause and course of disease from such "fictitious data."

After these imperfect returns have been collected by the assessor, they are copied by the township clerk and the copies sent to the Secretary of State. They are here tabulated, according to the directions of the law, in various ways. The forms used, having been long since adopted, are followed in stereotype fashion. This work is purely clerical, or a mere calculation of figures. There can be no analysis, comment or explanation of the meaning of the figures, because there is no sanitary expert superintending the work. Hence results a yearly report of incorrect returns, obtained at considerable expense, compiled and printed for the supposed benefit of the public, but consigned by that public to a well-merited neglect. Perhaps it would be no exaggeration to say that not in a single instance have these statistics been of the slightest value to any citizen except those who have

received fees for collecting them. To the State they are valueless, unless as a stepping stone to a better system.

METHODS OF IMPROVEMENT.

From this examination of the imperfections of the present system of registration, it will be an agreeable change to turn to the consideration of the best methods of improving and perfecting the registry.

The first principle to be established is that each event is to be recorded near the time of its occurrence, and on the information of some person personally cognizant and competent to give the necessary information. The experience of this and other States has shown it to be impossible to obtain correct reports, if taken by an annual census. The births are best reported by the parent, or the physician in attendance; the marriages by the clergyman or magistrate officiating, and the deaths by the attending physician, who alone is competent to state the cause of death with any precision. Another principle is that all these returns should be ultimately dealt with by the same officials. This may not seem to be absolutely essential, but the three records have for so many years been associated as to have established a kind of law by custom.

After stating these two principles the subject can best be considered in detail, by examining the facts to be recorded, the method of collecting them and their subsequent use and preservation, for deaths, births and marriages separately.

1ST—FACTS TO BE OBTAINED AND REPORTED.

Births.—Little change is required from the present law. There should be a statement of the names of the parents, date and residence, with some witness for the purpose of identification; also, for social inquiries, the birth-place and occupation of parents, and perhaps a few other similar items.

Deaths.—In addition to the requirements for births for purposes of record, it is also especially necessary to give the cause of death, and also, perhaps, the duration of the sickness. The cause of death should in all cases be certified by the attending physician, or by the coroner if there is no physician. This is

absolutely essential. No statement of the disease at second or third hand should be permitted. Perhaps in cities a few additional statements should be required, as, for instance, for tenement houses and other points of local sanitary importance.

Marriages.—Here there should be the usual requirements of name, age, residence, date, nativity, with the names of witnesses.

2D—METHOD OF COLLECTING OR REPORTING THESE FACTS.

Births.—The difficulty of obtaining a complete registry of these is far more embarrassing than of deaths and marriages. The method of making an annual census has been found unavailable. Attending physicians might be made responsible, but in very many cases there is no physician present.

Parents might be required to report births, but, on trial, this has been found ineffectual. A rigid law, with penalties attached, or a liberal compensation for returns, would no doubt aid in securing completeness. At present some of our cities have stringent laws and are seeking accuracy. In townships, if the collection is left to assessors, they should be subject to penalty in case of neglected or incomplete returns. Outside of cities, if the duty could be made to devolve on the Clerks of School Districts in connection with their census of children within school age, the smaller area and its coincidence with the other duty might secure greater accuracy. The most feasible methods are still under the careful consideration of our board.

Deaths.—There should be much less difficulty in obtaining a complete return of deaths. The event of death is, in a certain sense, a most public one, or at least the final disposal of the remains is public, and is a fit subject for legislation. This is advisable, on the grounds of decency, health, and the prevention or detection of crime. In many of our cities there are efficient municipal laws on the subject. No burial of a corpse is allowed without the permit from the proper officer, and such permit can only be granted on the certificate of the attending physician or coroner. These certificates are made to cover all the points required for registry. An extension of this law to all parts of the State would give a complete registry. The only apparent objection would be that in rural districts it might, on account of distance or otherwise, be troublesome to find the officer appointed

to give the burial permit, but the law could provide for such a contingency. In cities this officer is usually the city clerk, unless there is a special officer designated as registrar of vital statistics. In villages and country districts it might be the assessor, or if the township were of great extent and the population scattered, or in the absence of the assessor, or in other emergency, a justice of the peace might be authorized to give a special permit. City clerks or registrars should keep a list of all practicing physicians.

Marriages.—There should be no difficulty at all in obtaining a proper registry of marriages. Marriage being a civil rite, regulated by law, by authorized persons, clergymen and magistrates, these persons can be directed to make the necessary returns to the proper officer.

3D—USE AND PRESERVATION.

The first statement or certificates of the events being obtained and in the hands of the city or township officer, their proper use for sanitary, social and statistical inquiries, and their permanent preservation as records for future reference must be considered. As permanent records their proper place would be the county clerk's office, with other similar papers. For other purposes, they should be examined, tabulated and analyzed at stated times, by competent persons for the State at large.

At such periods as a general law might specify, all these returns, or a certified copy thereof, could be sent to the Secretary of State, that expert examination might be had of all the returns from every part of the State, so that a State Report could be prepared thereupon. The original certificates, if these had been sent, could then be alphabetically arranged and returned to the office of the county clerk of each county, or to the keeper of permanent city records, for permanent future reference. This would avoid the double expense which now occurs in many of our cities by reason of both State and municipal collection of returns.

The amount of compensation would not need increase unless a duplicate was required, and even then the full expense would be much less than that which now accrues in each township by reason of one unnecessary copying, and in many cities by reason of a double collection of statistics, which, practically, however,

is often double only as to remuneration. The change would once elevate this class of vital statistics into the field of appro mate accuracy, and enable us to study many health and l problems by the light of tabulated, significant and relial records.

Report on the Home and the School in Their Relations to Health.

BY EZRA M. HUNT.

I. The Home.—It cannot but be admitted that the most fundamental of all the relations of the citizen is that which concerns the Home. The domestic condition of a people is one of the weightiest concerns of the statesman. That is a wise administration which does the utmost that is practicable to secure to each person a residence where the best conditions of physical, intellectual, industrial and moral development are secured. Felt embarrassments, already meeting us in dealing with our population *en masse*, are teaching that somehow we must reach more effectually the starting point of influence. If the foundations be destroyed, what can the nation do? The studies of social science and the examination of social facts and results, are constantly illustrating how intimate are the blendings of home influence with all that constitutes the personality of the citizen and the welfare of the State as involved therein. In a republic, where the relation of each man is that of a citizen-voter, as well as that of a subject and co-laborer, the importance of the elements at work in providing material is essentially magnified. It would seem sufficient simply to announce the principle that the ability and usefulness of the citizen—his ability to govern and be governed—is more involved in his home rearing and home surroundings than in any other one question of outward situation and circumstance.

But when we pass to note facts in evidence, the modifications resulting from parentage, early training, home life, both youthful and adult, and the sanitary associations of domestic conditions, are still more significant and abiding.

The laws of physical inheritance and the modification of these laws by home surroundings and influence, are not less definite

than those of moral and intellectual force. Take up, for instance, the tenth report of the State Board of Charities of New York as relating to the causes of pauperism, and see how the results grow out from social and domestic conditions. Study any great circumstance as to the social *status* of a people, and you will more and more come to realize how much in individual and congregated instances is a legitimate result of present or former home life.

Nor is this as purely a question of intellectual and moral training as some seem to suppose. We cannot unwrap a man, woman or child from the folds of personal bodily environment.

The body, its growth, its care, its culture, and all those influences which have to do with its preservation in health, are no inconsiderable concerns in their bearing upon the common welfare. While we cannot agree with those who would resolve all mental and moral into material acts, and consider imperfect judgments and sinful deeds the result of disease, yet it must be admitted that abnormal physical conditions and bad household situations and unsanitary surroundings are large elements in mental and moral degradation. Even the demand for unnatural stimulus is often, in part, the result of depression arising from bad air and imperfect food. Alderman Waterlow, of London, and others, have shown by positive example how the poorer classes can be elevated in character by providing them comfortable homes.

The question of the health of a family is largely determined by the homes in which its members have been or are now being kept. These, too, determine whether they are to belong to the sustaining or depending class of society; whether as producers or consumers they occupy, or will come to occupy, a place in the commonwealth. This is one of the criteria of their value as citizens. If there is any one fact which sanitary science and investigation have made manifest in the last decade, it is that health and disease are far more within the reach of prevention, modification and control than was once estimated.

The power to improve bad physical organizations and to prevent new invalidity by hygienic influences is much greater than even physicians formerly supposed. Infantile diarrhœa and other bowel affections, once attributed to unavoidable accidents or considered the inevitable penalty for living to a second sum-

, are now unmistakably traced to intense heat, to imperfect ing or care, and to a very few other classifiable and mostly dable causes. Of the 21,204 deaths in 1874 in England from cause, 18,024 were under five years of age. When, as in ı cities as New York and Washington, we look after causes, we not slow to identify a very large proportion as associated ıth evils directly connected with home life. We need not com- are the enormous mortality with the small per centage of country listricts, but comparing different cities, or parts of the same ity, can easily show where and why disease is domiciled. In- leed, the graphic statist can beforehand draw his lines of greater ınd less intensity and predict the diarrhœal wave.

Developmental diseases, or those having their manifestation luring the period of youth, are definite both as to their causes ınd as to their limitation or prevention by good home manage- nent.

Contagious diseases, of which scarlet fever and diphtheria are specially formidable with the child, and typhoid (enteric) fever ınd small pox among the grown, are not only dependent upon pecific contagions, but the question of their malignancy, if not f their occurrence, is largely influenced by the condition of the remises into or upon which they alight.

Not less measles, whooping cough, croup and erysipelas are ounted among those zymotic diseases largely controlled by im- nediate surroundings and dwelling houses.

Consumption and other lung diseases making up so formid- ible a number of invalids, and tabulating so many thousands f death each year, are more controllable in their preventive and arly limitation than in subsequent treatment. Damp houses, ındrained premises, inadequate food, imperfect clothing and gnorance of those laws by which temperature is controllable, ıdd many a victim from those who might be saved.

It is not our purpose to furnish any exhaustive list of the ıvoidable diseases which are often engendered by imperfect ıome management, but merely to draw attention to the fact now o fully recognized that these are within the province and duty f home prevention. Besides it is not to be overlooked that many who inherit imperfect constitutions, and yet who do not succumb to disease, might be greatly improved by proper rear- ing, and that many of naturally good health are so placed under

untoward circumstances as greatly to impair their vitality. Such may not find an early place in the records of mortality, but by their imperfect existence their power of labor is impaired, their happiness curtailed, and others, it may be, through them, inherit an imperfect organization. The State is crippled by the home-errors of its citizens to an extent that is a matter of legislative concern. Governments seem too often constrained to provide for the results of imperfect lives, when much of the necessity might have been avoided by legitimate attention to the causes. While we are spending our millions on asylums, penitentiaries and pauperism, and suffering nationally because the consuming are gaining upon the producing classes, it well behooves us to consider whether we could not somewhat turn the stream at the fountain, and so influence American home life as to lift from it some of the burdens of ill health, sickness and death, and more fully insure in the families which make up the State the bodily conditions so indispensable to profitable labor, to thrift and to usefulness.

If not a very intellectual, it is nevertheless a very matter-of-fact view, that in every home human animals are being cared for. The adults are animals upon whose proper air, food, and surroundings not only their comfort but their life-force depends, and each child is an animal in process of growth under conditions which will very much determine what the future available power shall be. Spencer has said, "The first requisite to success in life is to be a good animal." The body is the machinery which is to be operated, and in so far as it is incapable of responding to the demands made upon it by its other resident or rather interwoven forces, in so far it is defective machinery, which is not fully equal to the service legitimately to be expected of it. So far as this is avoidable it is a burden which ought not to be imposed. So far as close rooms, irregular heating, mouldy dampness, impure water, bad sewers or outhouses, unfit food, accumulated filth or other preventible things are making sickness or causing the lowering of health standard, so far it is highly desirable to secure abatement. The limitation or removal of all such inflictions is as much for the interest of the State in its corporate capacity, as for the household in its family welfare.

There are two methods by which the State is to operate in this direction.

The first is by a proper diffusion of information and direction upon such matters among the people. It is well recognized that the government has an educational relation to children, not as a mere gratuity, but under the law of self-preservation, for without a fair degree of intelligence Republics are only ephemeral possibilities. But there is information for adults as well as for children, bearing so directly on civic welfare, that it cannot safely be dispensed with to the extent in which it is purely protective and does not involve burdensome outlay. In the homes where adult and young life are most affected by surrounding influences and where the health of all is dependent upon domestic arrangements, we cannot afford to leave the people in ignorance of the guiding laws of life. They must be informed as to the more comprehensive axioms of physical welfare and be warned against those insidious and frequent evils which are apt to be underestimated or overlooked, and which so often entail invalidity.

It is for this reason that so many European governments have instituted health authorities, whose duty it is to study those great questions which have to do with the social and domestic life of the people, and have enforced those methods which improve domiciliary indwelling. Our American methods being more at first to convince rather than compel, various States have established Boards of Health, whose duty is to point out those evils which are most distinctly certified, to present the methods of dealing with them, and by an annual report acquaint the people with their dangers and their relief. It is thus that we may hope to elevate and educate the families of the State into a degree of intelligence in such sanitary matters as most intensely concern the common welfare. These are interests that require for their elucidation and presentation the expert study of the scientist, the physician and the engineer, and yet when duly examined are capable of being recognized as of saving value by the people at large.

With all that may be said about the dilatory carelessness of householders to avail themselves of proper appliances for health, it is nevertheless true that unsanitary conditions are not so apt to prevail among those who are informed.

Many a man who now has his well too near the outbuilding, his house drains and cess-pools badly situated and managed, or

the necessary off-fallings of domestic life illy disposed of, would have made more suitable provision at the start had he known the dangers of contamination and the intimate relation of these untoward circumstances to diminish vigor.

With forcible facts before him, or the assurances of those who are fully informed, he is more likely to make indicated changes and to prevent the repetition of his error by those about to construct for themselves.

The need of pure water, its liabilities to contamination, the simplest tests of its purity, the necessities of good air and the means of securing it, the laws for regulating heat and moisture, the bearing of ground and house drainage on health, the laws as to foods and drinks, the evils of uncleanliness, and manifold other subjects, of which these are passing illustrations, if fairly presented to households are capable of comprehension by very many who have never thought much about them before. By the enforcement of clear principles and supporting evidence they educate on points in which individual comfort is concerned, and so have the chance of appreciation and application independent of the enforcements of law. Even where there is still neglect, they make that public opinion which the more readily accepts the enforcements of law in those cases where the corporate or local authorities deem its intervention necessary. The welfare of the State is so inherently involved in household health that it may well put forth some effort to conserve it.

It is partly in this view, too, that sanitary inspection has accomplished so much for those cities in which it has been most thoroughly carried out. All outside and general sanitary circumspection has been found inadequate in dense populations until it has been extended to a care for individual houses. There must be dealing with the root of the evil. It is the testimony of very many of these inspectors, as we have reason to know by careful examination of numerous reports, that they have often been of as much service by awakening the attention of the inmates to evils from which they were suffering, as by any direct insistance upon the application of legal requirements. While this may not be needed in less aggregated populations, yet in many larger villages and towns much benefit might be secured in this way.

In every school district of our free school State a member of the

Board of Trustees visits, or should visit, each house, for the purpose of enrolling the children who may be entitled to the benefits of the school fund. If the duty is not delegated, he is generally a person interested in the welfare of his neighborhood, and of the homes which each day send a part thereof to that next most prominent home, the public school. We believe it would be entirely possible to have such an one inquire also into the sanitary condition of domicils, and endeavor to guard the population there from those unhealthy influences which prevent so many of our scholars from growing up into all that stalwart fullness of health which is needed for the varied avocations of life.

There will, no doubt, still be a large class who from ignorance, from carelessness, from indifference or other causes will not respond to any methods of information, and for whom it may be necessary to invoke the enforcements of law in those cases where private rights or the public good are too gravely imperilled.

The crowded tenement house, the unkempt premises and those mentally or morally degraded will no doubt ever need the traction and scavenging of law. This will neither be difficult nor oppressive when those competent to discern come to appreciate how much one and all are involved in the protection of each home from such preventable sources of contamination as are within the range of ordinary ownership or tenancy.

It is because these interests of healthy home-life are so imminent and vital to the State, and because it is desirable, as far as possible, to substitute the intelligent appreciation of the household and the citizen for the rigorous enactments of compulsory legislation, that we desire so much the diffusion of knowlege as to the intimate relation between imperfect life-force and abatable causes of invalidity in the homes of our people.

The second method is by the direct exercise of legal authority. While it is our American boast that every man's home is his castle, yet we are not to carry liberty into license and make the independency of the individual a tyranny to society. If my fellow citizen runs stenchy slops into my street gutter, or keeps his premises in such a condition as that positive disease is engendered thereby, he is the oppressor and must be restrained. We would surround his personal rights with all due precautionary

protection. We must have the evidence clear. But, nevertheless, the right of dealing with such cases must be recognized and duly exercised. While we believe most in instruction, in persuasion and in that inspection which is at first informatory rather than compulsory, we believe the State has great occasion to inform itself as to the requisites of household health and the sphere of legal enactment in preventing concealed or open nuisances, such as are perilous to life or inimical to vigorous vitality. We would thus have it recognized that the condition of each home has a direct bearing upon that public health and public comfort which are so important to the welfare of the State.

The proper diffusion of intelligence, such inspection as is informing, instructive and precautionary, and if need be, such laws as compel the abatement of pronounced and unmistakeable nuisances, are the safe guards to the health of the citizen and to a degree the inalienable rights which municipal or State law should secure to their respective constituencies.

II. THE SCHOOL IN ITS RELATIONS TO HEALTH.

For the child there is another home beside that which he finds under the family roof. By the laws of our State, from the age of five to eighteen, he is recognized as having his appropriate place in the school-room. He is here to spend no small portion of his waking hours, under circumstances and conditions most vital in their bearing on all that relates to his future life. It is a home constructed for him by the State itself, in the common interest of the child and of the commonwealth. By law he is made the ward of the government. It behooves it well to consider the terms of the guardianship and the charge involved. He is here to be fashioned as to his body and as to his health, no less than as to his mind. It is a deep, broad and high concern of society whether the boys and girls who, at the age of five, crowd to the school house door and are seated in the school room for a period reaching over ten or twelve years, are there to find those aids to physical health to which they are entitled by nature and which involve so much as to the effectiveness of their future citizenship.

May we not apply as an axiom the idea of Simon, in another connection, and say, That whatever work the State assembles its

children to do shall, as far as depends upon it, at its cost, be divested of all needless unwholesome circumstances.

It is not a mere charity, but for the public welfare, that the free school seeks to offer to the masses such education as can be received amid the best conditions for health. Fitness for the labor of life is the ultimate result sought. It is not for special intellectual eminence that New Jersey opens wide the door of ingress to the free school. It is for usefulness. Far more than is generally felt this means such education as will make the person effective in his or her occupation. It is that it may fit the pupils for entrance upon their life-*work* which, with the most of them, means manual labor. It is to give that training which will make them *force-full*, not only as to skill and intelligence, but as to bodily endurance, too. Labor is to be the working capital, and that preparation which does not recognize this is fearfully incomplete. They are to be *operatives*, and they are to operate their bodies in skillful handiwork, not less than the student does in more isolated brain work. The school-child body is not a mere outside wrapper for the mind, to be taken off when the mind is polished aright, but is itself the very instrument. Indeed, in a sense the mind is secondary, the body primary. The body is fitting to be worked by the mind, just as much as the mind is being trained to regulate the body.

The casket is not to be broken and thrown away so soon as the jewel becomes brilliant. It is the casket that is to be handled and made strong for the inevitable stress and strain to which it is to be subjected.

It is at a time, too, when over tension, or cramping restraint, or unfavorable conditions in anywise, will tell for permanent evil more than at any other period of life. The fact that "children are young and can stand a great deal," is over-stated. In a weighty sense, because they are young they are far more susceptible to deranging influences, and the symmetry of coming life is more easily marred.

The young lives, as Simon puts it, are finer tests of foul air than are the elder and perhaps acclimatized population. Many an influence resisted by older lives, if exerted during the formative periods tells for permanent impairment of a normal vitality.

Besides being the period of general impressibility, physically

as well as mentally, school life includes the two crises of second dentition and puberty.

There are not only the physiological processes of organs to be performed, such as circulation, inspiration, secretion, etc., but growth is going on meanwhile, and, besides, there is the special awakening of new activities at these periods. The nervous system is aroused into its highest ardor, and all susceptibilities are increased. Wrong management not only affects organs, but development. Two vital processes occurrent at the same time are more easily deranged than either could be alone. Still more dissonance is possible when we consider that the derangement of either breaks links in a long and exquisitely wrought chain of harmony, and so disorders generally.

Experience is constantly informing sanitarians how frequently the disabilities of physical life have their foundation in school circumstances. Thus the child, instead of having himself developed into capacity for life work, is so educated that one department of himself is trammeled and often terminated by the other. One leading design of common school education should therefore be to make the body effective, and so to culture the mind and soul as that they shall administrate the body wisely to this end.

Yet in the attempt to impart capacity we organize incapacity; for nothing turns into incapacity so fast as ill health.

Jarvis and other eminent statists have made careful computations to show how many days and years sickness abstracts from the effective force of individuals, and so from the capital of the State.

If the same examination is conducted as to the shortening of the labor period by too early exhaustion or its embarrassment by partial invalidity, it is found that the aggregate force and the aggregate years of working life are being abbreviated.

A degree of this may be traced not only to the "tyranny of a bad organization," but to the equally destructive tyranny of school-day experiences, which has made sad havoc with many a hardy scion or failed to enable those less favored to grow into a vigorous manhood. For not only should the school-room and the school secure the requisite condition for vigorous health, but both, by regulation and instruction, should indoctrinate the pupils into the conception of the necessity of health, its depen-

dence upon right management, and should guard them against those evils to which they are most naturally exposed during the period of their growth.

So far from accomplishing these positive and educational results, how patent is it that at the present day the average school-room and the usual process of education greatly imperils the health of the pupils.

Turning in manifold directions, we have only to compare the actual conditions which obtain, with the well-understood requisitions of a healthful vitality,

AIR CONDITIONS.

Take, for instance, the two leading necessities of good air and regulated temperature.

Boston schools are nearest a model of any in this country. Yet in an examination of forty, made in 1871, "the average proportion of carbonic acid found was 1,393 parts in a million, or nearly four times the normal amount existing in the outer air. (See Mass. State Board of Health Report, 1871, page 405.)

Dr. Endermann, in a series of examination of schools, in New York city, in 1872, found the proportion of carbonic acid varying from 1,400 to 2,700 parts per million.

Of forty-six school-rooms examined by Prof. Kedzie, in Michigan, but four gave less than 1,200 parts of carbonic acid per million; twelve from 1,200 to 2,000; nineteen from 2,000 to 3,000, and one from 4,300 to 4,900 parts per million.

Last year the city government of Cincinnati authorized Prof. I. B. Hough "to make such surveys of the school buildings and chemical analyses of the atmosphere therein as should establish clearly and fully their actual sanitary condition."

We quote as follows from his elaborate report:

"It will be seen by the appended table of analyses, that a number of school-rooms were found to contain considerably more than one-tenth per cent., (the amount stated as tolerable,) and that even in the best ventilated rooms of the newer houses the per cent. is quite materially above the average out-door quantity. It is true that a person can become habituated to the endurance of a vitiated atmosphere, * * * a process

which, though it trains the child to live on impure blood, yet trains it to live a poorer and feebler life."

The report covers over forty different rooms, and draws the conclusion "that in a large majority of cases the ventilation of our school-rooms is injuriously defective."

As to air space, it is generally conceded that from 200 to 300 cubic feet is the smallest allowable for each pupil. Yet in 265 rooms in this great city of schools only 29 afford 300 cubic feet, 166 less than 200 feet per pupil, 22 less than 108.5, 14 less than 100.

There was often found great defect of pure air, of moisture, and various defects in other regards.

In twelve school districts the schools were reported as suffering from the odors arising from neighborhood nuisances. There is no reason to believe that the showing as to ventilation, etc., is beyond that occurring in many of our cities, and in no inconsiderable degree in very many towns, villages and rural districts of this State.

Brooklyn makes no better showing, and the fine architectural schools of Philadelphia are strangely defective as to their ventilation. Such schools have the principle of Babcock's Extinguisher. As it puts out fire by its surcharge of gas so do these effectually obscure the light of intellect.

In villages and towns, while there is more freedom for air, there are lower ceilings and less care is taken to discharge the air at recesses or at the close of the daily session, because janitor service is less perfect. The exposure to draught is greater and teachers as well as scholars come under our care as a result of bad ventilation. It is to be borne in mind too that children by virtue of their growing and "active vitality in proportion to their weight are twice as powerful as adults in deterioriating the air which they breathe." Being seated much of the time at nearly the same level, and that not so favorable as if a higher one, they are more apt to rebreathe the same strata of foul air. Air which has been once breathed has lost about 5 per cent. of oxygen, and had added to it 5 per cent. of carbonic acid. Stoves and furnaces add to this lung supply of carbonic acid.

Besides the amount of carbonic acid is not to be regarded as the full measure of vitiation. Soiled clothing, and exhalation from the skin and lungs, bad breath and the results of imper-

fect food and digestion give to many of our public schools a fearful amount of floating organic matter.

Amid the lower classes many a boy has his clothing saturated with the smell of his untidy home, which for want of sufficient change of garments is not swept away by outer airing. The lungs and the skin throw off watery vapor to the amount of 25 to 40 ounces each 24 hours, and organic impurities of 30 to 40 grains other than the vitiated air of the breath are constantly being voided. In the great open, and with cleanly clothing, these find easy riddance, but not so in the huddled embrace of the desk row. The aggregation of children under such circumstances too often causes them to be distributers of contagion.

Facts as to the potency and putrefactive decomposition of organic matter plainly point us to increasing care as to its constituency and harm in school-room atmospheres. Dickens describes it as a "strange unwholesome smell, like mildewed corduroys, sweet apples wanting air, and rotten books" (David Copperfield, page 33). But even when present in quantities more deleterious than the carbonic acid, it is not always detectable by the senses. The headache and general malaise from which school children often suffer is largely owing to this.

HEATING.

As to Heating, most are well aware that this is apt to be very badly regulated in the school-room. Imperfect attention to furnaces or stoves, made to generate carbonic oxide or other bad gases by extreme heating or shut dampers, give rise to manifold evil results. In fact the entire regulation of heat as to our schools needs the care and study of teachers, school officers and the public generally. The introduction of anthracite coal instead of wood has much complicated the whole question of ventilation and heat, so that our schools suffer greatly from sudden extremes of temperature and from air whose impurity is increased by the heating arrangements. Beside other impurities, ordinary coal gas has usually from five to seven per cent. of carbonic oxide. (See Wood, Public Health Ass'n, vol. III.)

Often the interference with moisture or distance from the dew point is so great that the air passages are irritated, and catarrh, coryza, bronchitis, or more serious lung affections result. This

undue dryness of the air, as shown by Buckheim, constricts also the depth of inspiration, and healthy evaporation is embarrassed. Virchow rightly attributes most of the pulmonary diseases of children to overcrowded rooms, to changes of temperature in passing from hot rooms to the cold stairways or outside, to the dust of the school-room and the impaired respiratory movement induced by prolonged sitting. I once asked Brown-Sequard how it happens that nervous diseases abound more among Americans than with the quick and versatile French. His reply was: "Your miserable hot-houses have much to do with it."

It must be admitted and realized that the evils of defective ventilation and heating find their intensest illustration in the average American school room. There are so many disturbing elements, so many embarrassing complications. The audience is a child audience, in an assembly room where they sit much of the time and stay several hours in succession. The individuals are not re-dressed for the occasion like a church or concert audience, not under charge in small groups as at home, nor to leave in an hour, as in the usual public hall, and are of ages, of clothing, of conditions of health, and of home life so different as to give great variety of susceptibility. They are, too, very differently affected by the mental processes they are attempting.

We must realize the embarrassment and not despair because of its reality. For the coming nation, the young citizen is here at a time when unsanitary conditions will tell upon the household at home, and upon the future of the child always.

The cry of philanthropy and political economy, and of State free school jurisdiction is, that we give concentrated attention and investigation to the subject proportioned to its difficulty and the stern gravity of the interests involved. The wardship we have undertaken must not be discharged at the expense of the health. If health or being itself is imperilled in learning to conjugate the verb "to be," or if a knowledge of the boundaries of Siberia involves pulmonary risks equal to a voyage thither, better have a little less learning and a little more strength.

These are vital questions to a degree that involves not only personal comfort, but the threatenings of race-degeneracy and national decay. The present condition, both as to ventilation and heating, can certainly in very many cases be amended and made to accord with well ascertained methods of improvement.

Besides these prominent interests as to air and heat, there are other infringements having important bearing on public hygiene.

In many districts greater care should be exercised to insure personal cleanliness. That old adage "Cleanliness is akin to Godliness" means all it says. An eminent British sanitarian began his reform by changing the "personal" of his tenants. The wash bowl, the glass and the penny comb in the pocket are valuable when at the command of the pupil. When water is cheap and paper towels are available there is no excuse for soiled face or dirty hands. In the best schools of Holland there is beside the teacher an attendant, who sees to the personal condition of each child upon entering the school each day. This one thing has something to do with Holland thrift as well as Dutch neatness. Children who are not washed all over each week, whose clothing is soiled by the grease and dust and bodily secretion of months are sources of air poisoning that can not be disregarded. Long hair and foul caps are good nestling places for harmful particles. Such persons are not in the best condition for mental work. Facts as to zymotic or other contagious diseases are rapidly showing us how such persons become common carriers of disease, and how epidemics otherwise mild and circumscribed are made malignant and wide-spread. The cloak room, in which the outer garments of children are so often huddled together, instead of being a dark side closet, should be a well-aired room. While we have no disposition to interfere with the rights of dress unduly, yet the right to dirt is not as inalienable as that of life, liberty and the pursuit of happiness.

The increase of eye diseases is marked in our own country as well as in Germany, England and France, where it has attracted large attention. Agnew, Loring, Derby, Williams and other oculists here have fully pointed out the facts coming under their cognizance. Modes of study, the individual position, the direction and the intensity of the light are greatly concerned in this. The usual arrangement of desks compels many of the pupils to face the light or to receive it too fully sidewise.

What is called the architecture of school buildings is far too little directed to proper lighting. Near-sightedness, weakness of eyes and need for artificial helps early in middle life accrue from the school oftener than as a result of any congenital defect. In the frequent black-board exercises of schools we have noticed

how, by reason of their position or that of desks, the pupils before them are not able to adjust their positions at the angle or distance that suits them. Indeed confusion in figuring often arises from constricted distance or undue shading or glare of light. These boards are often on the wall, along the aisles, with but little intervening space, and with unfavorable illumination. The eye is a great organ, for the mechanic and merchant as well as for the student, and we greatly need to have more attention turned to such care of it during school life as shall not enfeeble it for the present, or shorten its time of effective service after the meridian of life.

The evils of defective desks and constrained positions and an inordinate use of one side to the neglect of the other, are points telling much upon form and symmetrical development. Rudolph Virchow asserts that the schools are largely at fault as to modes of seating and posture, and thus accounts for distortions of the spine, and especially that form of curvature known as scoliosis, or lateral curvature. There is much in the present arrangement of desks to disturb that equilibrium of antagonistic muscles on which erectness depends. Hamilton, in his recent complete work on surgery, says, as to treatment, "Boys must be taken from the desk, the counting-room, and from the school-houses, where they are compelled to sit many hours each day upon benches without backs, and girls must be taken from schools where health is always held subordinate to deportment and scholarship."

Females, more especially, are found to suffer from malposition and congestions in the pelvic, even more than in the spinal region. Some three years since Brown Sequard delivered a lecture at Washington, in which he claimed that "there is a connection between development of the brain as regards the mental faculties and the development of the brain as regards leading movements on one side of the body." He avers that in education "an important point should be to make every child, as early as possible, use the two sides of the body equally—to make use of them alternately. Not only the right hand but the right side, in all its parts, is put too much foremost. There is a much greater difference in the power of motion and sensation in the two sides with very many than is supposed. In girls this is especially manifest, as not so much equalized by out-door exer-

rise. Various necessities of posture and constrained sitting in school, foster this tendency. This want of coördination, and the use of one side out of proportion to the other interrupts the dualty of nature, and gives rise to muscular disabilities." What is called the "writing position," by Guillaume, inclines to this.

The increase of nervous derangement in all grades, and of varieties of paralysis showing themselves too early in life, should lead us very closely to guard against those strains on the nervous system, which either cause lesion or such impairment of function as manifests itself in spasm, paralysis, chorea or other disorded states.

An article before the American Social Science Association, May, 1875, by Dr. D. F. Lincoln, of Boston, ably treats of "The nervous system as affected by school life."

He speaks especially of dyspepsia, sleeplessness, irritability, headache, chorea, neuralgia, hysteria, spinal weakness and menstrual anomalies and general depression, as directly resultant oftentimes from traceable school errors.

THE MATTER OF SEATING SCHOOLS.

The matter of seating schools, the size and mode of desks and the variations imparted by recitations and other changes, should receive far more attention from a hygienic view than they do.

Not only the locality and the kind of seats, but their adaptation to the size of the pupil is most important. The back of the seat slightly rounded, should fit in just below the shoulder blades, the width of the seat support the leg about half way to the knee, and the feet always very easily reach the floor. With the tendency to sit forward in the seat, a slight inclination backwards is desirable. The edge of the desk should be just opposite the nipple, with a very moderate slant, which really would be better varied by the character of the work to be done upon it.

Dr. Guillaume gives the following as the proper heights for desk, stool and seat back—11 Swiss inches being equal to 13, English measure. Where there is an inclination, as in the usual desk, the edge may be a trifle lower:

HEIGHT OF PUPILS.					HEIGHT OF DESK.	HEIGHT OF SEAT.	HEIGHT OF BACK.
Feet	Inches		Feet	Inches.			
3	6	to	3	9	15.8	9.5	11.9
3	9	"	4	2	17.0	10.3	12.9
4	2	"	4	5	18.1	11.2	14.0
4	5	"	4	8	19.2	12.2	15.0
4	8	"	5	1	20.4	13.1	16.1
5	1	"	5	4	21.6	14.1	17.2

The evils arising from lofty buildings and long flights of stairs have attracted the attention of some observers. Children, in our cities especially, are thus often constrained to this somewhat unnatural and unduly fatiguing exercise. It is an especially exhaustive motion, throwing the pelvic and other muscles into unnatural action, and deterring some from exercise in order to avoid repeated ascent. It is said that man is the only animal who will voluntarily climb a stairs. "It is recorded in the memoirs of the incomparable Martinus Scriblerus how, in his eager pursuit of knowledge, he met with an extraordinary misadventure through the ignorance of his assistant, Crambe. Having secured the body of a malefactor, he hired a room for its dissection near the pest fields of St. Giles, at a little distance from Tyburn road. The body was carried by night without much difficulty on Crambe's back, who found it easy, being both young and lusty, to travel along the level road, carrying on his legs the double weight of the malefactor and of his proper self. As soon, however, as he commenced to ascend the staircase, the wonderfully increased exertion (twenty to twenty-five times as great as before) began to tell upon Crambe, and, as the accurate narrator records, upon the corpse also; in consequence of which Crambe dropped his burden in disgust and fright and allowed it to roll down the staircase, while he himself ascended breathless into the upper room, where Martin, scalpel in hand, eagerly awaited the arrival of his expected subject." We cannot vouch for all that happened to Scriblerus or his Crambe, but here, at least, the laws of animal mechanics seem to magnify the reality of the burden, for the work of carrying loads horizontally is easily shown to be about 1-25th part of the work done in lifting the same loads vertically through heights equal to the horizontal distances.

IMPERFECT JANITORSHIP.

The duties which ought to devolve upon a school house attend-
t or janitor are among those most important and yet most fre-
ently neglected in our public schools. In Germany in all
hools of good size the janitor lives in the school building. It
eds to be realized that the buildings require to have brought
to requisition most of the principles which apply in the proper
re of a family dwelling. It is good *housekeeping* that our
hools must have if we wish to have them to be places for the
eping of health. No woman at the head of a family would
ink of putting thirty or more children in one room for each
y and leave its sweeping for the close of the week and its gen-
al cleansing to a yearly overhauling. Not merely disorder,
t dust, dirt, greasiness and unavoidable friction and use must
ake any such room unhealthy unless its need of this house-
eping attention is recognized. Too often the service of the
nitor has in it but little akin to the care of the good house, and
nsists merely in attention to a general sweeping and clearing
such as conveys the idea of respectable appearance to the
erage man. But of all other rooms the school room most
eds the introspection of diligent attention. Thorough airing
it and the side rooms adjacent is desirable at the close of each
hool day, soon after the scholars have left. Such sweeping as
t only cleanses the aisles, but about the desks must be quite
equent. The dusting looks not merely after the upper surface
the desks and seats, but after the books and whatever things
ay have got out of place among them. A washing of the
sks occasionally is needed to remove the soiling that inevita-
y occurs. No kind of furniture more frequently needs the
newal of a coat of varnish than that of the school room. In
rge and crowded schools, when not too cold, an emptying of
e air by opening the windows at each recess will be of advan-
ge and the room should be entirely vacated.

Care should be taken to see that the cellar and all unfre-
ented closets are kept clear from the gathering of any nuisance
d these should be included in the daily care.

In smaller schools where no attendant is employed, similar care
ould be exercised by the aid of the scholars under the direc-
on of the teacher. Indeed, in either case the teacher should

be held responsible to see that proper housekeeping is secured and consider it as a part of his work thus to protect the health of his pupils. A personal sanitary inspection each week, which shall include the basement or cellar, is an important part of his supervision.

The care of the grounds also requires some attention that all causes of nuisance may be avoided. As their pleasantness and the various arrangements for recreation and exercise that can be devised, aid much in relaxation from study and in that diversion which is refreshing, these come into consideration as bearing upon the hygiene of the school as well as upon facilities for exercise. It is often noticeable that girls too frequently spend their recesses in the school room and so not only prevent its refreshment by air, but also fail to secure that benefit which ought to be derived from a brief outdoor enjoyment. The whole subject of the relation of the school grounds and of gymnastic provisions to health is too extensive for discussion here and we only refer to it as to be recognized in its bearing or successful education within.

PRIVY CONVENIENCES.

The privy and the well are the two prominent appendages to every school property which need to be carefully considered and provided for in all schools.

Where, as in some cities, all provision is indoor, there is some advantage in the easy securement of cleanliness, under careful inspection, but all the evils that may arise from foul gases, imperfect traps and ventilation, and imperfect flushing are to be sedulously watched. The water closet is to all intents a public one, in that it receives the excretions of those differing more in health than do members of the same household, and bringing together masses, some of whom are not unlikely to be affected by bad sanitary administration at home. The closet itself should always have secured to it special ventilation, and the janitor daily employ some disinfectant to secure greater cleanliness. For out-door arrangements the number of appliances have kept pace with the practical difficulties involved.

The "school sink," much used in New York city, is thus described: "It consists of a long iron trough or tank, (with water

in it) at one end of which is a draw-cock, giving a good supply of water, and at the other an aperture of exit, secured by a plug or stopper. When it is desired to get rid of the excrementitious mass the plug is removed, the water at the other end turned on and the contents soon swept into the sewer. The plug is then replaced and secured and the sink is again ready for use." (N. Y. 17 City Health Report, 1870.) This is not so easily disordered as contrivances depending on the pupils, and if attended to each day secures against the evils resultant from entire dependence on the traps in the connecting sewer.

The common privy vaults or ash pits, if cemented or so arranged as that buckets beneath would receive the daily contents, are far more easily managed than household privies, for the reason that they are used only a part of the day and on Saturdays are entirely unused. Abundant opportunity is thus afforded for that frequency of change which avoids large accumulation, and avoids also that decomposition which is the chief nuisance of these outbuildings. It is the amount that renders the condition uncleanly and embarrasses its removal. If the janitor each day sees to the condition of the privy inside, this of itself would usually secure neatness, and if the accumulation is removed each week both the ease of disposal and the value of the material commend the method. But, alas, an entirely opposite course is pursued. All this is regarded as vacation work. Too often the early summer finds the school midden already too foul for endurance, and the filthy mass is left for a summer vacation disposal. All this is so totally wrong that the teacher and the trustees must see to it that this prevalent nuisance of annual or semi-annual clearance is summarily abolished. Let a weekly or monthly removal be enforced, and all such embarrassments vanish.

The use of lime, plaster, etc., are always of service to correct any odor, and there is greater reason for absolute cleanliness and less excuse for exceptions to it in the school outhouse, than in those more constantly in service.

WATER SUPPLY.

We have always insisted that as far as possible each school should have its own distinct water supply. If from a city pipe, it should be so introduced as to be easily accessible, and should

have near it a cup and a self-emptying wash bowl, for the use of scholars. It should be supplied to each floor so as to avoid the necessity of frequent stair descent. Care must be taken that the pipes and faucet are such as not to impregnate the water with any hurtful metallic particles.

In case the water supply is from a well or cistern outside, the greatest care must be taken to preserve it from the contamination to which the carelessness or mischief of children may expose it. The covering should be so tight as not to admit anything from the surface, and the ground so raised about it as to throw off any outside drainage. A permanent trough beneath, with a spout to carry off the water, prevents much soiling directly at the well, and is a convenience in the drawing of the water. It is not difficult to have near at hand a self-emptying wash basin, and these aid in securing cleanliness. The purity of the water can only be assured by an occasional examination. If there are special indications of foulness the well must be cleansed or the water submitted to a chemist. Some reference to ready tests will be found at the close of this article.

CONTAGIOUS DISEASES.

As a large class of diseases is especially communicable to children, it would be a natural inference that as they gather each day in masses, or come, it may be, from homes in which some are already sick by contagion, they must become the carriers and diffusers of such diseases. Careful statistics show this so largely to be the case, that school authorities recognize it. Instead of precautions to prevent it, the one sovereign remedy seems to be to disband the school. This is often unwise educationally, and indeed not promotive of general good health. It would be far better, if in case of any prevalent epidemic the trustees immediately inquired into the families under their charge, or informed themselves as to local cases of sickness such as rendered it inexpedient for other members of families to attend school, and cautioned parents not to send those in any degree unwell. A superintendent of schools in one of our counties recently told me that he visited a large school in which several of the pupils had their necks bandaged, and, in two or three instances, poulticed. On inquiry as to the cause he was told that diphtheria

as prevailing. When he heard afterward of its spread he was ot in doubt as to the cause. The practical working of the contagious disease acts of Great Britain and Holland show how much can be done to prevent such a catastrophe.

RECESSES.

In the Kindergarten system, accurate observations have been made as to how long children of various ages will bear interested attention without fatigue.

Much of the cry about the evils of long school attendance and the advocacy of half-time schools, arises from an imperfect adjustment of work and play, a lack of variety in position, and a disregard of the rest to be secured by the proper variety and adjustment of studies. A child will be invigorated by mental as well as by muscular work, if only the music of its life has its rests. There is a great American tendency to work continuously for several days or weeks, or even months, and then make up for it all by a Sunday sleep or a summer vacation. The method tells badly on the general health, and even more when its influence extends to our schools. The decided inclination is to crowd all school hours between 9 and 1.

Let the child have a recess every half-hour or hour if only five minutes, a change of study and of posture, and an occasional singing or gymnastic exercise, and he will endure many hours of schooling with ease and benefit. A half day of all work and a half day of all play is often a strain and stress on the system, while an intermingling of the two, according to age and degree of effort, is not harrassing. If children are received into school so early as five years of age—which seems to us of very doubtful expediency—they need great care lest they be exhausted by overrestraint; but even here it is not so much a question of time as of method. To those older, there must be a careful adjustment between study and recreation. The bearing, too, of times of recess upon eating, is not to be overlooked. Children do not endure long fasting well, and if eating hurriedly the tax upon the digestive organs is all the more severe. A quiet meal every four hours is oftener than otherwise the rule for school children. Those who are kept at school until one and then hasten home for a hearty meal often suffer from the fast. Much of the irrita-

bility of children over their tasks the physician can trace to that exhausted vitality which arises from unintermittent exertion, delayed meals, or other unsanitary circumstances. The habits of long fasting or promiscuous eating, which are the legitimate outgrowth of the attempt to finish up the school day rapidly, is largely telling upon the health of our American people.

Such are a few of the more prominent ailments which attach to the modern school-room, and such the chief points that need to attract our attention in its hygienic management.

There are many other matters, such as exercise, mental hygiene, rewards and punishments, and the times and length of study, the best assortment of studies for healthy mental development, etc., which involve the most skillful circumspection of the phenomena of mind, and of those points of contact so frequent and intricate by which mind and body act and react on each other.

On these it is not our present plan to dilate, but only to call attention to their vast importance, their direct bearing on health as well as on mental power, and the necessity that those having the charge of children should rightly estimate the profound and weighty hygienic questions which have so important a bearing on the present progress and future welfare of the child.

It has thus been our object, first of all, to draw attention to the extent of the field of observation, and the immense interests which are concerned in the school period. A great and desirable object is attained if only we can sound to the great public the cry, Attention! There are multitudes who send their children to our public schools in such a routine way that they little think how far their entire life destiny is involved in their experiences there. Even when recognizing that they are to attend for discipline and instruction, there is little thought of the health of the body, which is to be as really moulded and decided there as the progress of the mind. But if only parents pause to think how habits of physical as well as of mental life are there formed, and that the surrounding condition of the child, just as much as the soil and locality of the plant, determine to a great degree its future, it is easy to awaken them to some sense of the interests involved. Good air, right temperature, right light, right posture, cleanliness, right drink, right surroundings, mean far more for the mental as well as bodily con-

dition of the child, than is estimated. Character and future capability for industry, thrift, sustenance are all concerned in the school period, and every citizen should feel it. One of the first remedies, therefore, for evils, is to do just what the State Board of Health is doing here—to draw the attention of the citizen to the reality and pressing necessity of these interests —to the fact that they are largely overlooked, and that to a great degree they admit of correction. The reason for not dwelling upon them more fully or with greater exactness of detail is that investigations on these matters have already been made in various countries and states, which need no new and special experiments in our own State to confirm their accuracy or their applicability to us. The mere statement of the facts ought to be enough to gain the admission from the public mind that a real importance attaches to the subject.

The minds of parents and citizens being thus drawn thereto, with the admission on their part that these interests need attention, the natural question is, What is proposed to be done in order to secure a greater avoidance of existing evils for the future?

DUTIES OF TRUSTEES.

Our first point is that the trustees of our schools need to make these matters a special subject of their own intelligent study and supervision. There is no class of perfunctory officers in our State that more need to magnify their office. They are the appointed guardians, the constituted foster-fathers of a great family of children, committed very largely to their care by the State. Their duty is not merely to learn that there is a schoolhouse, that a teacher has been hired, and that the machine will, on a certain day in September, be put in motion, but to look after the preparative condition of this large child-family as its health wardens. We ask that they hold themselves responsible that the children whom the State, in self-protection as much as in liberality, has assembled for education shall, as far as possible, be divested of all circumstances which will in any wise tend to the least imperilling of physical health. To this end the points which we have noted, and others that experience may suggest, should be subjects of their careful guardianship, and should be attended to as a part of their obligations to the State, and to the district as well, as a token of their heart-interest in the children.

DUTIES OF EDUCATORS.

Next to these, and perhaps practically even more, must we look to the State and county officers of education. They, from their intelligence and information, and personal identification with school-interests on a broader field, may be expected to have good vision over the great field of responsibility opened up before them. The Normal School, the State Superintendent and the various County Superintendents need themselves so to be impressed with the health-interests involved in the education of children, that with the pressing enthusiasm of a far-reaching discernment, they shall push home upon trustees, teachers, all school guardians of youth, the vital necessity of intelligent appreciation of these imminent concerns, and so far as in their power see to it that they are not overlooked or slighted. It is pleasant to know that in our State such offices are generally filled by men who have shown adaptation and capability, and an enthusiastic energy in their work. Although some of them have not yet been able to magnify or enforce these considerations, we believe there is of late a new impression of the critical necessity of new advisement in these regards, which only needs to be deepened by a more thorough study of the subject.

Besides, each individual *teacher* is to be reached. The teacher himself needs a wider view of his own relation to physiology as a study. There are many already that appreciate it as a worthy part of general information, and a branch which may be vindicated for a place in the class-room. But more than this is needed for the teacher who would come to realize the intimate and integral relation of a knowledge of physiology and the laws of health. He needs this not half so much in order that he may teach it, as he needs it in order at all to comprehend his calling. The structure of a man, his physiology and modes of working, and the condition under which the whole being is to be operated in any educational process, are so vital and fundamental that he needs to realize some of this knowledge as an underlying principle in all education. The physical, the intellectual and the moral are so bound together in that composite creature we call a child, that we cannot regulate the developments of children unless we know much of the parts that make up the whole. Some knowledge of each is necessary to the proper management of

any one part. "We cannot," says Maudsley, "understand mind function without embracing in our inquiry all the bodily functions." Mental phenomena have their corporeal conditions, which must be understood physiologically. The real teacher should have studied the entire article with which he has to deal. If his idea of physiology is merely that it is a proper subject for teaching, like botany, he will merely look upon it as an interesting branch of science, and will perhaps teach some of its deductions formally. But it is not until it enters strongly into his conceptions of adequate preparation for dealing with the child at all, that he will come to grasp it with his whole head and his whole heart. A recognition of it as fundamental to all questions of education is needed in order even to give full force to that special department of only one of the parts of physiology known as hygiene.

Thus the teacher will be prepared to estimate the statement when we say that the care of all things that relate to the hygiene of the child or his sanitary surroundings is a part of his occupation. Now-a-days is there not too much of the feeling among teachers, and of the permission of such a feeling by his employers, that he is hired for a few hours each day merely to direct the intellectual development of the child? We take a far broader view of his high professional and official relationship. He is put in charge of a body of youth, in the interests of the State, for the purpose of doing his utmost to make of them such material as will be available for its growth and prosperity. The oversight of the parent and the training of the citizen is for no inconsiderable time transferred to the teacher. To look after the ventilation and temperature and moisture of the room, to secure cleanliness on the part of the pupils, to see that the building and its surroundings are healthful, and that the scholar has secured to him the best conditions of progress, is far more intrinsic to his work than a lesson in geography or a trial of the spelling class.

The three essentials for the teacher in this regard are, (*a*) that he should himself have a fundamental and practical recognition of the subject; (*b*) that he should know existing evils and the most efficient remedies; and (*c*) that he should appreciate his own official responsibility. He must not compliment himself as doing gratuitous and philanthropic work, but know himself de-

fective as a teacher unless in such matters he conserves the highest interest of the wards under his charge, not less than in recitations.

The next condition of success in abating or preventing school evils is to have (*a*) such arrangements as shall permit the full application of the best known laws of health for school; (*b*) the ability to remedy known defects, and (*c*) such tests or knowledge as shall make it possible to acquaint himself with the actual embarrassments.

The first (*a*) necessitates the right choice of building ground, the right construction of the building and all those conditions which favor the best administration. These need not be specified here, but as it is much easier to construct aright than to amend, all these should be carefully understood by those who plan, and even by others, in order that they may know wherein their own prearranged buildings and methods are defective.

(*b*) Defects being known the remedies are such as will most nearly conform to what should have been or to those arrangements and conveniences which are granted to be desirable.

The third (*c*) necessitates a knowledge of the evidences of defect and the ability, if need be, to resort to those expert tests which manipulative science furnishes.

As affording some aid, it may be well for us here to recapitulate some of the best understood principles of management and of avoidance of evils, and to record such tests of defect as are of ready application.

These will not be exhaustive or complete, but will aim to present the best settled views of those who have given large attention to these great interests.

EYE DISEASES, AND HOW TO AVOID THEIR INCREASE IN SCHOOLS.

Have no windows in front of the scholar. Secure as much light as possible from above the level of desks. Outside cornices and near proximity of other buildings should not cast a shade or interfere with the light. The space around should bear proportion to the size and the height of the building and to the height of adjacent buildings, and the size of the windows should be from one-fifth to one-sixth of the floor space, (Cohn, Lincoln, etc.): Burnett insists on one-fourth. So a room twenty feet square

should have about twenty square feet of glass. If the building has its corners pointing to the cardinal points of the compass some advantage is gained as to the direct rays of the sun. (Olmsted.) Gray or blue tints are best for the inside walls and trimmings. Some advocate green, but yellow rays incline to mingle with the green and these are objectionable.

It is better to have the light coming from behind and next best from the left side. For this reason some advocate only left windows for school rooms. But the matter of ventilation is also to be considered. Lincoln sums up the best sustained view, as follows: "Windows on the right are slightly objectionable, as throwing a shadow on the page whenever the hand is used in ciphering, drawing and writing. Windows at the back throw the pupil's own shadow on his book, but this is not a serious matter, except for those who sit next a window, and they have light enough at any rate, while for writing they are extremely well placed as it is usual to turn partly to the left in this exercise. Windows at the left are entirely free from objection, as far as they can be free. The ideal light should come from over the left shoulder, or the right shoulder if one is sitting up and reading, but if looking over a desk this is rather inconvenient, and the best is then a very high light from the left and a little to the front. In brief, the rule for placing windows is *never* in front, *always* on the left; at the back, also, if you choose, but not at the right, if you can help it."

The child standing at the blackboard should never face the light. Blackboards between side windows should be dispensed with, unless the blinds are closed on the side used.

Not only is a squint or cast in the eye often remedied or prevented by proper light, as is shown in Donder's method of curing it by adapted spectacles, but short-sightedness (myopia) is caused or aggravated by studying with improper light, as is also that long-sightedness, which tires with the book or writing at a usual distance.

Indeed, the fatigue, the pain of the forehead, and often slight temporary squint show how the eye is being overtaxed.

SEATS AND DESKS.

Floor space is needed, not only for these, but for ventilation. The average should be not less than 25 cubic feet for each scholar.

A good rule as to the relative height of seats and desks is, "that the desks should be of such a height that the elbows may rest upon them, when the body is erect, without any displacement of the shoulders."

A straight back, or lightly curved at the top, is most available, and, unless coming to the middle of the shoulder blade, should not be high enough to touch its lowest angle.

The desk should usually slant about 30 degrees, but may be made adjustable so as to be accommodated to reading, writing and position.

The distance between the seat and desk will need to be accommodated somewhat to the size of the scholars, but should nearly enable the child to fill the seat while leaning forward. Other points have been already noticed. As desks and seats are exposed to much soiling, they should be made of hard wood, treated with hot linseed oil and varnished, so as to admit of easy cleansing.

All shelves should admit of removal for cleansing, and even ink wells should hold by the rim, so that there be no dust bins beneath them.

THE HEATING OF SCHOOL ROOMS.

The evils to be guarded are excessive heat, excessive dryness, excessive cold, too sudden variations of temperature, too much dust from the heating apparatus, hurtful gases from the heater.

(*a*) For excessive heat or cold, or too sudden variations of temperature, the thermometer is the ready test. There should be in each school room not less than two thermometers, about equidistant from the centre of heat, and the furthest point in the room. One of these should be about half-way between the floor and the ceiling, and the other about one foot from the floor. Where rooms are larger, and the points from which the heat is derived are more numerous, more thermometers are required. These are inexpensive, and in information to the pupils and regulation of the temperature, will well repay the outlay. It should be the duty of the teacher to register at the opening of the school, at the close of its morning session, and in the middle of the afternoon session, the thermometer records, and to have these

or the inspection of the trustees at their meetings. 68° (F.) is about the desirable average here, but variations from 66° to 72° are within the range fitted for the majority.

(*b*) Excessive dryness of atmosphere.

The usual wet and dry bulb thermometer, used by the meteorologists, is the most reliable test of this, and will do in place of one of the others. The reading of the dry bulb is the same as that of the wet bulb.

The most healthy state of the atmosphere can be obtained when the dew point of the air is not less than 10°, or more than 20°F. lower than the temperature of the room, and can be easily familiarized by the teacher.

"The dew point is that temperature when the air is just saturated with moisture, so that the least further fall would cause a deposit of water. * * What the thermometer indicates this to be is the dew point. When not thus saturated, the temperature of the dry bulb is above that of the wet bulb, and both, of course, above the dew point. The temperature greatly affects the amount of moisture, yet whatever the moisture may be, the lungs are giving off air nearly saturated. In a cold morning the watery vapor of the breath shows itself, and what is given off by the lungs and skin exceeds that by the urine. If there is excessive moisture with high temperature, we are oppressed with heat out of proportion to the registry of the dry thermometer, for evaporation is interfered with. If, on the other hand, there is great heat with undue dryness, evaporation from the lungs, skin, etc., goes on too rapidly.

"The air in the school-room should be three-fourths saturated with watery vapor. The best way to test the degree of moisture is to suspend two thermometers side by side, one in the usual condition, the other with a bulb covered with a thin piece of cotton cloth, kept constantly moist by dipping a portion of the cotton in a suspended cup of pure water. The difference in temperature between the wet bulb and dry bulb thermometer will indicate the relative dryness of the air. Thus, if the dry bulb marks 65° and the wet bulb marks 60° the air is exactly three-fourths saturated, and the difference between the wet and dry bulb thermometers should not exceed 5° in any school room." A simple contrivance for testing moisture is one suggested to me in a note from Prof. Kedzie, of Lansing, Michigan. "Write a

sentence with chloride of cobalt on white paper, using a little glycerine to keep the writing in a moist condition if the air is not too dry. When moderately moist, the chloride of cobalt is in a hydrated form, and is then pinkish but not strongly colored, and the writing is nearly invisible. In a very dry air the chloride becomes anhydrous and is deep blue, and becomes visible all over the room, especially if written with a camel's hair brush to make a broad mark." I have a single specimen sent me six months since which always, on being heated a little, becomes blue, but breathing upon it the blue soon disappears.

Even a hair as used in the hair hygrometer, by the changes on the dial plate, shows how decided is the effect of varying degrees of moisture. It marks the degree of humidity quicker than do the dry and wet bulbs.

In the school-room the almost universal registry, during the period of artificial heating, is that of too great dryness.

The remedy is to provide water for evaporation, not only in the furnace, or by warm water placed on the stove close enough to the fire to secure evaporation, but also by tin hot water holders inside of such registers as pass the hottest air.

Baked and dried air is very different from the outside air meant for breathing. Attention to this moistening of the air is indicated even where it is not thus tested each day. "For temperatures between 60° and 70° Fah., if we moisten the air we may reduce, by several degrees, the temperature without suffering discomfort."—(*Winsor.*)

Chilliness may denote dryness of air rather than a low registry of the thermometer.

"One result of the poisoning of the blood by impurity of air is the extreme susceptibility of the system to cold."

In the summer, it must be remembered also that the temperature of the school room and the humidity of the air are affected by exposure, by draughts and by proper *housekeeping*. The care of the janitor between school hours, as to airing, as to closing against direct rays of the sun and giving it the full advantage of night cooling, are all important. During school hours, too, the parts exposed to the sun should be shaded by the blinds and draughts secured in the best directions. While we may not regulate outside temperature, we find that the inside temperature of houses during the absence of artificial heat is greatly

aried by modes of construction, by airing, by regulation of light nd of sun rays, and by the various devices or neglects of igh graded and degraded housekeeping.

As dust and hurtful gases from the heating apparatus make a ontamination of air, which naturally associates itself with dust nd foul gases from other causes, these will be fully considered nder the head of

VENTILATION.

The chief call for this in school rooms arises from,

(*a*) Stagnation or imperfect motion of air.

(*b*) Carbonic acid gas accumulated from breathing, from stoves and lights, etc.

(*c*) Other gases from overheated stoves, or from decay of organic matter, as furnished by the individual and his surroundings.

(*d*) Dust and organic particles of various kinds floating in the air.

Imperfect motion of air may be caused by the state of the atmosphere, or by conditions incident to the room in which the upils are congregated. The chief difficulties arise from overowding, from imperfect provision for that circulation of air hich takes place in the open and from the production in the oom of those defilements of air which make its more rapid hange desirable. The indication is to prevent as far as practiable all contamination of the air and then secure for it the greatest freedom of motion compatible with freedom from undue draft. Air may move at the rate of about two feet per second without perceptible motion or draught. Happily, even this velocity is not needed for ventilating purposes under usual conditions. It may be increased where extreme heat or moisture or other embarrassments render the air more stifling than ordinary.

A small instrument known as an *anemometer* measures the velocity of the currents of air. Casella's small air meter answers a similar purpose.

The revolving paper mills of children, or a light feather will often indicate the direction of air currents. These practical lessons in philosopy, in the hands of a good teacher, are a part of education as well as some of the instructions in natural

philosophy contained in the text books, and are fully as interesting as well as of immediate practical service. A thermometer in the line of a draught will show a degree of heat much less than one quite near it, not thus exposed.

To secure proper change of air various methods are devised. Some trust entirely to the windows, which according to the etymology given by some, were so called because found of service as wind doors. Windows ventilate best when slightly lowered from the top and raised from the bottom.

In other cases chimneys are made available, especially when occupied by fires. For summer and early fall ventilation these are of much service, and their flues may have connection with the school rooms which are easily regulated. A downward draft is easily detected by a lighted match or taper, and where there is need of an upward draft not found, the heat from a kerosene lamp or a gas jet, properly adjusted, is sufficient to move the body of cold air in the shaft.

Sometimes a shaft is provided through a building connecting with a louvre window or cupola upon the ridge of the roof by which an upper current is secured and rapidity of current increased.

These are ordinary resorts available in connection with what is known as natural ventilation.

There are besides two methods of artificial movement of air. In the one known as the plenum or propulsion method, by means of a fan or other contrivance, air is driven into rooms in imitation of a breeze, and is sought to be regulated in its introduction by various arts and appliances.

If this air thus propelled can be so atomized as to enter without sensible currents, you secure a regulated flow.

The other is that known as the aspiration, vacuum, suction, or exhaustion method.

Instead of pushing out air by driving in new air, and so making circulation, it pulls out air, and thus causes other air to rush in its place, and so currents are caused.

Sometimes the one method is applied to the introduction of pure air, and the other to the removal of the fouled air, or they are interchanged in other ways.

We can not here discuss the various methods and appliances of artificial motion of air, but only allude to them here in order

hat by an outline of the principles involved, when used in our chools, those employing them should recognize that, in order to ucceed in a hygienic sense, they must be carefully regulated. At present we think we may say that the introduction of air, by ome method of propulsion, in cases where more than natural entilation is needed, is more generally applicable.

CARBONIC ACID AS A POLLUTION OF AIR.

Our next inquiry is as to the evidences of the presence of carbonic acid gas, accumulated from breathing, from stoves, lights, etc.

The degree to which this needs guarding is apparent from the fact that while a cubic foot of pure air does not contain more than a cubic inch of carbonic acid gas, a cubic foot of air given out by the breathing contains seventy cubic inches of this gas. So one person in a tight place containing 56 cubic feet of pure air would, by his breathing alone, bring up its amount of carbonic acid to one per cent. To this must be added the amount occurring from the decayed particles always being given off by the lungs, the skin, and from various suspended particles undergoing decay in the atmosphere. Beside, if there is fire or light, very cubic foot of coal gas adds two cubic feet of carbonic acid nd takes away ten of oxygen.

Three hundred and fifty cubic feet of air may be stated as an verage of the amount needed each twenty-four hours. As we re thus constantly befouling the air of a room by our own reathing, and by organic particles, combustion, etc., in order hat the amount of carbonic acid shall be kept at from 1-10th to -6th of one per cent., 2,000 cubic feet of air must be admitted ach hour for each person. Practically we know that we cannot nove the entire air in a room oftener than three times per hour ithout draught. On this basis about 650 feet of air is needed for ne person; but the amount theoretically needed is modified by he shape of the room, by the fact that it is not air-tight, and hat rooms themselves greatly vary as to their perviousness and ther modes of ingress and egress of air. Thus the reckoning is often found extravagant for the open sitting room and inadequate for the close jail, the hospital, or the crowded soldiers' barrack. School-rooms occupy an intermediate place, and tests

already noted show that they are generally too confined. We therefore take the general guiding facts, and test their variations by actual experiment.

The most available test is that given by Dr. Angus Smith, which is varied in details by some experimenters. The direction is: Let us keep our rooms so that the air gives no precipitate when a ten-and-a-half ounce bottle full (*i. e.*, of air,) is shaken with half an ounce of clear lime water. Prof. Kedzie puts it thus:

To test whether air does not contain more than 8 parts of carbonic acid in 10,000 of air, fill an eight ounce vial with pure water (rain water). Empty out the water in or amid the air you wish to test; the vial will then be filled with the air of the room. Pour into the vial half an ounce of clear lime water and shake thoroughly. If it remains perfectly transparent, without any trace of milkiness or turbidity, it does not contain more than 8 parts of carbonic acid in 10,000.

Prof. H. B. Cornwell states it more fully, thus: "Shake burnt lime in a bottle with water, and allow it to settle clear. (You thus have fresh lime water.) Clean a very wide-mouthed bottle inside with a linen cloth, exhaust the air by suction through a tube, with great care not to breathe into the bottle, which would have to be cleaned again. Pour in one half-ounce of clear lime water and shake well. If the air contains not more than the percentages of carbonic acid below, and the sized bottles there given are used, no turbidity will ensue from the carbonate of lime."

Table to be used when the point of observation is "No Precip itate:"

20.63 oz., avoirdupois, bottle will have no precipitate if the carbonic acid is				0.039
15.60 oz., avoir., bottle, if it is only				0.040
12.58	"	"	"	0.050
11.57	"	"	"	0.060
9.13	"	"	"	0.070
8.05	"	"	"	0.080
7.21	"	"	"	0.090
6.54	"	"	"	0.100
6.00	"	"	"	0.110
5.53	"	"	"	0.120

5.15	oz.,	avoir.,	bottle, if it is only	0.130
4.82	"	"	"	0.140
4.53	"	"	"	0.150
3.52	"	"	"	0.200
2.92	"	"	"	0.250
2.51	"	"	"	0.300
2.01	"	"	"	0.400
1.71	"	"	"	0.500
1.51	"	"	"	0 600
1.10	"	"	"	1.000

In other words, as instances from our table, a bottle holding eight and a half ounces of air, with a half ounce of lime water shaken in it, would show no precipitate or turbidity if the amount of carbonic acid was not more than .08, i. e. eight parts of carbonic acid in 10,000 of the air in the room and bottle.

If a six ounce bottle is used, with the same amount of lime water, there might be .11 parts of carbonic acid to 10,000 of air, and yet there would be no turbidity; or if a two-ounce bottle was used there might be forty parts of carbonic acid to 10,000 of the air, and yet no turbidity ensue.

Now if a bottle of eight ounces, with a half ounce of clear lime water, gives turbidity, you know that there is more carbonic acid in the air than is regarded as desirable for a school room.

If a six ounce bottle, with a half ounce of lime water, gives turbidity, you will know that there is more than eleven parts of carbonic acid to 10,000, which is an excess.

If a two ounce bottle should give turbidity you then know that there are over forty parts of carbonic acid to 10,000, while there should be not much over eight parts to 10,000.

By testing with different sized bottles, after you have once found turbidity, you will be able to find out nearly the proportion of carbonic acid.

Although carbonic acid, in moderate excess over the amount found in the open air, is not so actively poisonous as some imagine, yet as displacing or substituting oxygen, and as poisonous when in large excess, its quantity needs watching. Our breaths furnish it, our heating and lighting appliances furnish it, and it is one of the gases of that decomposition or decay which is con-

stantly going on where organic particles are separated from their vitalized relationship.

So it is more apt to be excessive in quantity in close or heated rooms than are most productions of decay, combustion and change. Even beyond its own evil import, when it is present in excess it affords an approximate criterion of the deterioration of the air in other and worse regards.

Yet where there are special sources of contamination, as from bad surroundings, super-heated air, ill clothing, untidy habits, or unhealthy persons, the carbonic acid is not the full test. There are vitiations of air of which it can not be the measure. Ammonia, sulphuric acid, sulphuretted hydrogen, sulphide of ammonia, some of the nitrogen compounds, some of the acids formed by the oxidation of oleic acid, with nitric acid, some undefined gases, such as sewer gas, and various volatile excretions from the lungs and skins of animals, also contaminate the air or in their oxidation burn out its chief vitalizer.

Of these the excess of carbonic acid is not a very accurate test, although leading to suspicion as very likely to have them in company when found largely amid animal existence. Often the quantity from a lime kiln would not injure, while the same amount in school air would betoken a presence of other gases which are doing the most of the real harm.

Ammonia may be detected by the logwood paper. "Tincture of logwood is evaporated to dryness and the residue *dissolved* in ether; strips of filtering paper are dipped in it, to which ammonia gives a brownish color." Sulphuretted hydrogen is best detected by exposing strips of blotting paper dipped in a solution of acetate of lead.

Ammonia sulphide is detected by paper dipped in a solution of nitro-prusside of sodium.—(*Parkes.*)

The entire absence of ozone, or its speedy destruction when generated, generally betokens much organic matter, which is rapidly oxidized by this agent. The presence of ozone may be tested by Houzeau's test. "Expose litmus paper of a neutral tint soaked in a dilute solution of iodide of potassium; the potash set free by the action of the ozone turns the paper blue. The same paper, without iodide, would indicate the extent to which the effect might be due to ammonia vapor."

Both in this country and England patent ozone generators are in

use, which regulate the burning of phosphorus by which ozone, or negative oxygen, is produced. As ozone is a ready oxidizer of organic matter, and is in the state of a gas, it seems specially fitted for the removal of gases of decay from indoor atmosphere, while free ventilation both neutralizes and dispels organic matter. We believe that ozone may yet become a valuable aid in purifying crowded school-rooms during the hours of occupancy.

HEAT, AS A SOURCE OF HURTFUL GASES.

During a large portion of the school year in our climate, as we are dependent upon artificial heat, the maintenance of the purity of the air is much complicated thereby. Besides heat itself is the great factor in the regulation of currents, and so of ventilation. Artificial heat is very liable to introduce gases which deteriorate air, and so comes to be a source of contamination in common with other allied sources of befoulment. Our effort with artificial heating should be to furnish just for breathing what is furnished out of doors when the atmosphere is warmed by the sun. Our imitations are not very successful, as they become more artificial.

In combustion carbonic acid is, of course, always produced, and besides, from the nature of the heating material now generally used, and from the often imperfect combustion carried on by artificial apparatus, we get various gaseous and acid sulphur compounds, etc. While in a perfect system of heating these would all find their way through the smoke flue, yet with impeded or red-hot combustion, imperfect metal and imperfect joinings of parts, very much often escapes into the rooms.

The odor is detected, the stifling felt, or if not, the house plants, the books and the furniture in due time register the effects.

Sulphuretted hydrogen, sulphurous and sulphuric acid, and carbonic oxide are not unfrequently to be detected by chemical tests in the heated air. More recently special attention has been called to carbonic oxide, which contains one more equivalent of carbon than the carbonic dioxide generally known as carbonic acid gas. It is far more deleterious than the latter. Less than one-half per cent. has produced poisonous symptoms, and in charcoal suffocation more of the effect is due to it than to the

carbonic acid. It increases in quantity when fuel is burned with an inadequate supply of pure air.

It is very apt to be generated when anthracite coal heats cast iron cylinders to a red heat. Even wrought iron stoves, when overheated, will pass much of it out through imperfect joinings. The contact of the air with the over-heated metal seems also to deprive it of much of its oxygen.

Much of the weariness, headache and oppression arises from such air by heat diminished in its oxygen, by ill conducted combustion laden with carbonic oxide and various deleterious gases, and from the dryness produced by superheated air.

According to Prof. Böttcher, strips of linen or cotton soaked in a concentrated solution of chloride of palladium, as free from acid as possible, assumes a very black color when brought in contact with carbonic oxide.

The value of sensations as a test is not to be overlooked in close and wrongly heated rooms. Children, and especially those at home used to a pure air, are available and sensitive tests of impurities. When many complain of headaches, closeness of air, depression and discomfort, it is quite likely that something more than carbonic acid is the cause, and that organic matter or carbonic oxide, or some of the gases of decay, are present.

Scrupulous and enforced cleanliness of person is also of great importance for schools, as excretions from the skin and the soiling of clothing are equally contaminating with outbreathings and surroundings.

DUST AND ORGANIC PARTICLES IN AIR.

Dust and organic particles, derived from other sources than those mentioned, besides their tendency to decomposition, inflict evil by mechanical irritation. An examination of the minute particles in public buildings in New York City, revealed a considerable amount of fine powder of horse manure. Pollen and particles of various kinds are not unfrequently found mingled with the air, especially when it is very dry.

These are to be detected by sunbeams, by the microscope, and by optical experiments such as those of Tyndall in his recent lectures in this country. Under the British houses of Parliament they have an admirable arrangement by which all the air

is strained and moistened. The deposit left upon the dampened hemp or cloth is quite convincing as to the need of such a device.

In school rooms it is of especial importance that sweeping and dusting be done with care, for if there is much dust to raise it is pretty certain to be raised. The furnaces often add dust through the registers, some of which might be retained by moistened coverings frequently changed.

Dry cleansing of the walls and ceilings should be occasionally attended to, even during term time. There can be no doubt but that the application of lime-wash to the wall above the wainscoting, once or twice on Saturdays during term time, in very crowded schools, is of service.

It is thus evident that neither the scientific laws as to air nor artificial arrangements are entirely sufficient. We need to understand the general requisites, the sources of befoulment, the methods of test, and then to exercise that watchfulness without which most methods fail, and with which science and art now afford us sufficient aids to secure successful results. These none need more to know and apply than our school authorities, and with no class of interests in regard thereto is our State more identified than with that of its children and wards in its public schools.

WATER SUPPLY.

Having already alluded to the kind of water supply desirable, it only remains here to notice the easy tests which may indicate its condition, or which may lead to such suspicion as to call for laboratory investigation.

Water which tastes or smells badly or is turbid, is always suspicious, and either to be tested or refused. If organic matter is present a few drops of permanganate of potassium added will give a red color, which will quickly disappear. The water should be at a temperature of about 140° F., to make the test more satisfactory. The solution of permanganate of potassium becomes brown or turbid in contact with suspended or dissolved organic matter. "If water acts greatly and rapidly on potassic permanganate, nitrates or sulphuretted hydrogen will probably be found; if not, the rapid action is from organic matter which

is decomposing; probably animal, as vegetable matter acts more slowly."

A closer test as to appearance and taste is to put the water in a close flask or long bottle at ordinary temperature. It should still after a few hours be clear and colorless, and when shaken give no offensive smell.

It is important to know whether much chlorine is present in water, for although a little salt may be the innocent cause, yet as chlorides increase in proportion "as a water is contaminated by sewage, any unusual amount of chlorine is suspicious." Ordinarily 1 to 2.3 grains of chlorine per gallon is all that should be present.

Prof. H. B. Cornwell, E. M., of Princeton, kindly gives me the following method:

Procure a wide-mouthed bottle of clear, white glass, holding 5 ounces up to a certain mark. Put into it 5 ounces of the water to be tested, and add enough pure chromate of potash to give when dissolved a distinct, clear, yellow color. Get the druggist to weigh out for you 15 grains of crystallized nitrate of silver, and dissolve this in 16 ounces of rain water, caught after several hours of hard rain, in a clean vessel. (Distilled water is better.)

Some means of measuring out small quantities of this nitrate of silver solution will be required. A graduated *minim* measure, as used by druggists, will serve very well; if this cannot be procured, a homeopathic vial holding a drachm (one teaspoonful) may be graduated into quarters, or even sixths, by marks scratched on the outside with a file, and will then do very well.

To the five ounces of the well water to be tested, containing the chromate of potash, add from the graduated measure, with constant stirring with a glass rod, just enough of the nitrate of silver solution to produce a *permanent* reddish tint. A reddish orange color is deep enough.

Try the same experiment with two or three well waters, which, from their location and qualities, may be presumed to be free from sewage or similar contamination, and if it is found that the well water first tested requires half as much again of the silver solution, or twice as much, or possibly even more, to produce the reddish tinge, it certainly contains more chlorine than

the soil ought to yield and may be suspected of sewage contamination.

As regards using the homeopathic vial for a measure, considerable accuracy may be obtained by making first a rough experiment, and then a more careful one on a second portion of each well water, taking the precaution this second time to add the last quarter or half vialful of the silver solution (found to be necessary by the rough experiment) drop by drop, until the permanent reddish tint is produced.

It is best to set the bottle holding the water to be tested on a piece of white paper, and to rinse it thoroughly, before making the test, with some of the water to be tested. It is best not to make the test immediately after a heavy fall of rain. The silver solution will make an indelible stain on clothing. The reddish coating formed in the bottle used for testing the well water, after several experiments, is easily removed by nitric acid, as also the blackish stain that may be formed on the measuring vial. The nitric acid must, however, be very thoroughly removed by rinsing with rain water.

The silver solution should be freshly prepared, or if kept a very little time should be protected from the light. Water near the sea naturally contains more chlorine than that of mountain districts, but in most cases the test is informing, where there is no unusual addition of common salt or other chlorides to the soil.

Such are the principal matters to which in considering the care of children in the home and the school, it has seemed proper for us to invite executive attention, and, through you, the thoughtful consideration of the parents, teachers and guardians of our State free school system. The building of a body is as important as the building of a brain. If only we can help to impress all with the urgency of the need to guard carefully these school-room conditions, it is our hope that in the future we may aid in devising plans of improvement, and in suggesting such scientific and practical tests as will not leave us in doubt either as to real conditions or methods to be adopted for securing alleviation of existing evils. Our hope is thus to co-operate with those who are endeavoring by a free education to make each child fit for such life-work as shall bring happiness and prosperity to the people and thus confer a blessing on the State.

Domestic Hygiene.

BY J. M. RIDGE, OF CAMDEN.

The great and transcendent necessity of having pure air, pure water and pure food in the house, will be admitted by all candid persons. For if these, which are the chief sources which maintain life, are contaminated, then the citadel of life is in great danger of destruction. But to come at once to the more practical details of the subject. What are the avenues by which these stealthy foes, the germs of avoidable disease, enter to surprise and sap the citadel of life? The same as those through which the supplies for its garrison are introduced. The nostrils, into which benignant Deity once breathed the breath of life, are too often the conduits for the miasma of death, and the bread, which should be the staff of life, proves but a broken—even a poisoned—reed, piercing with a deadly wound the bosom that unsuspectingly leans on it for support. The object of the hygienist, then, is to convince the people of the absolute necessity for pure air, wholesome food, and healthful beverage to bodily vigor and length of days; to make them understand that to neglect to ensure these is to disregard the claims of laws as inexorable as those of gravitation; that when the head of the household, in the full vigor of manly maturity, or the darling of the family, in the early bloom of perfect health, is suddenly snatched away by the grim destroyer, it is no more the part of piety than it is of wisdom to prate with folded arms of the mysterious dispensations of Divine Providence, and urge submission to His will. This is but to charge the results of our own stupidity and neglect upon our Maker, or as another has forcibly expressed it, "to flout our filth in the face of Deity." Preventable disease, which it may be fondly hoped will one day include all disease, may indeed be a scourge in the hand of the Almighty, but it is for the infraction of those of his laws which are written in the book of nature, not of revelation. The book of revelation does

indeed contain a hygienic, as well as a moral code, so comprehensive and searching in its conception as to indicate Divinity as its originator, and so clear and practical in its details that, were it studied with one-tenth part the devotion which is bestowed upon other portions of the book, and were an honest effort then made by Christian nations to live up to its strict regimen, we might almost look for a renewal of the forty years miracle of the desert in the complete stamping out of all disease. And the key note of this admirable system is *Purity*—purity of air, purity of food, purity of water, purity of clothing, purity of habitation, purity of person, purity of life. Beyond this we shall never get as a foundation principle for sanitary science. The hygienist will, however, but half have done his duty when he has educated the public conscience up to the highest pitch of sensitiveness to the sin of uncleanliness. He must also show how it is to be avoided. To this end he must summon to his aid the chemist, both the detector and destroyer of impurities in whatever element of nutrition they may exist; the geologist, whose practiced eye reads upon the surface the occult conditions beneath, which may generate disease; the engineer, without whose aid he will make but sorry work in his efforts to remove those accumulations of filth, which he so well knows to be the hot-beds of pestilence; and the architect, in whom we must put our trust for an air as pure within our homes, our churches, our concert halls and our schools as that which sweeps, laden with health, over the beautiful and odorous hills. And now we come to the consideration of pure air, in our dwellings, as one of the necessary conditions to domestic happiness and health.

Pure air, according to the numerous analyses of Dr. Angus Smith, is composed of 20.99 per cent., by volume, of oxygen, .033 per cent. of carbonic acid, and the rest of nitrogen, watery vapor and traces of ammonia. We shall now direct our efforts to the pointing out of the means by which the air in our dwellings may become polluted, and also those by which it may be preserved in its purity We change and pollute the air within our houses in two ways: 1. By admixture of substances which were not in the air when it came to us; and, 2. By changing its normal composition.

Both are unavoidable, but there are limits which must not be overstepped.

The impurities may be in the nature of gases or dust. We an become aware of them by our senses, by sight, by taste, but stly by smell. The last sense is exceedingly sensitive for ny substances; for instance, traces of ethereal oils. Nothing nore wonderful than its acuteness in some savages and anils. If we consider the minuteness of the substances left by nted game on the soil, which it scarcely touches in its flight, l how the dog detects them even a long time after, we cannot ficiently admire this acuteness of the sense of smell.

Other substances make themselves known in other ways, netimes by some physiological effect. Oxide of carbon, for tance—a gas which is generated from burning charcoal—is t perceived by any of our senses, but if it is present in air to extent of a half per cent. only it destroys human life after hile.

Other substances again, as the products of distillation of fats, the smoke of wood, irritate the membranes of the eyes. Other pors and kinds of dust act on the taste; for instance, aloe-pow-r, etc., etc.

We rightly consider all air which acts on our senses or our lings differently from air in the open, to be polluted.

The second way in which we render air impure on its journey ough our houses is that of altering the quantities of its comients. We deprive it of oxygen by our respiration, by the ning of lights and fires; we increase its carbonic acid and its ter by the activity of our lungs and skin, and by numerous ceedings of the household.

All these pollutions and alterations are partly avoidable, partly avoidable. Among the latter are those by our lungs and skin, ause we cannot live without producing them. To the former ongs everything that from a want of cleanliness, careless treatnt of waste and refuse, passes into the air-current. It is an xcusable waste of ventilation, if it is directed against avoida- pollutions of the air. If I had a nuisance in my room I uld be very silly if I kept it there and trusted to stronger ven-tion. The rational way is to do away with the pollutions, not keep them and to fight them by ventilation.

Without strict cleanliness in a house or public institution, all trivances for ventilation will not do much good. The proper main of ventilation begins when cleanliness, by rapid removal

or careful shutting off o air-polluting substances, has done its best. It is only against the deterioration of the air by respiration and perspiration, which is beyond the control of cleanliness, that ventilation can direct its power, and against this deterioration this power must be chiefly directed.

A series of examinations has resulted in the conviction that one volume of carbonic acid in 1,000 volumes of room air is the extremest limit which divides good from bad air. This is generally adopted and practically proved, provided always that man is the only source of carbonic acid in the space in question. And it has also been ascertained, by careful examination, that the quantity of air necessary to maintain man in a healthy condition, is 2,100 cubic feet per hour.

In the city of Camden and vicinity, so far as we have been able to observe, there is no system of ventilation attached to the private dwellings, and, therefore, the external air makes its ingress and egress through the doors and windows of the houses. Necessarily under such conditions the air of the dwelling houses must be more or less impure. In some instances we have found that the privies which are located in some of the houses, owing to the imperfect closure of their valves, admit foul air from the culverts into the houses to the great annoyance of the family, and, in a few cases we believe that typhoid fever has resulted therefrom. It is therefor, better never to have privies within the dwelling houses. Also, a very prevalent custom in our neighborhoood is to close the windows and doors against the free admission of light which is as necessary to health in the house as good ventilation by pure air. We would, therefore, say to those who are fearful of the discoloration of their carpets and warping of their furniture that it would be better to cover their carpets and furniture, and thereby protect them from the light, but by all means to admit freely into their dwellings the *pure* and *harmless* sunbeams of heaven, which are so necessary to the maintenance of good health.

Another bad custom which has come under our observation not unfrequently, is that of using bed clothing which has been in contact with persons having contagious diseases—such as typhoid fever, typhus fever, diphtheria, scarlet fever, small pox, etc., etc. In some of the more virulent of these diseases it would be far better to burn the clothing rather than run the risk of using

igain, even after a thorough boiling and use of disinfectants.
ie case we will mention shows the dangers of this custom, as
believe. A little boy about 16 years old was affected with
phus fever in this city. We were summoned to attend him.
e had him put in the third story of the house, in care of a
od nurse. The family was not permitted to go to, nor remain
his room, but merely to send articles of food, etc., thereto.
fter he recovered we ordered the clothing burned, which, it
peared afterwards, was not done, but it was packed away in
ie garret, after being merely washed and dried.

The family moved out of the house in which the disease oc-
irred into another some three or four squares away, and in the
llowing winter the bed-clothing which was on the boy's bed
as unpacked and used. Very soon after that, typhus fever
oke out in the family in the most virulent manner, and did
t cease until three members thereof had fallen victims to its
vages.

This case clearly indicates that all clothing which has been in
ntact with contagious diseases should be thoroughly disin-
cted, if possible, or burned.

In this connection we would commend to the attention of our
izens a system of ventilation which may be applied to both
blic and private buildings.

Whilst general hygienic laws attempt to protect the purity of
e external air from vitiation, we must also secure free admis-
n of it into our houses, and provide means for its escape as
on as it becomes unfit for use. This constitutes the science of
ntilation, in which much is yet to be learned. In such a
imate as ours it is necessarily associated with the subject of
tificial heat. The old idea of ventilation was to admit fresh
r at a low level into the room, and allow it to escape at a high
vel. This, however, was found to be very wasteful of heat, espe-
ally when the source of heat was a hot air flue; as the warm air
entering, immediately by virtue of its rarefaction, ascended to
ie ceiling and then escaped through the ventilating aperture,
ithout having warmed the apartment, and leaving the air,
hich did not lie directly in the path of its current, cold and
agnant. Sanitarians, therefore, have been led to think that,
th for efficient renewal of air and for economy of heat, the

true plan is to have the foul air escape near the floor, as it is in that most effective of all ventilators, *the old-fashioned open fireplace.*

In order to ensure this result in houses heated by warm air flues, a very ingenious device has been brought forward by a well-known citizen of Germantown, Mr. George R. Barker, which has so far met the approval of scientific men in Philadelphia, that it has been introduced into all the new buildings of the university, a practical endorsement which makes anything beyond a simple demonstration of its design quite unnecessary at this time. At about the level of the floor of the apartment which it is proposed to heat, the masonry hot-air shaft in the chimney is hermetically surmounted by a cylindrical tin or iron flue, somewhat diminished in diameter from the lower end for a short distance up, in order to leave a considerable space between it and the original flue walls, and curving over so as to discharge its contents horizontally into the room.

Immediately below its open mouth, terminating in a register, another register, entirely separate, although for the sake of beauty made in one piece with the first, opens into the primary flue. Now, what follows the entrance into the room of hot air from the supplementary flue? Simply this, that the warm air rises to the ceiling, becomes chilled, falls, and is distributed through the room, and finally, forced by the incoming stream of warm air, seeks an exit. This it discovers at the second register immediately below where it entered, having made the complete circuit of the room, given up its heat, and taken in return whatever of impurity it could come in contact with, of a portable or diffusible character. Here it finds the necessary element for ascension, namely, a heated flue, and readily passes out and up. A most complete circulation of the air of the apartments is thus secured, and at the same the heat is all utilized.

Before we conclude this part of our subject, we will notice that attempts have been made from time immemorial to preserve the air of the sick room from contamination through unwholesome, offensive or contagious emanations from the persons and excretions of the patient, by the use of chemicals. Many substances so used have been simply deodorizers. Others have masked the unpleasant odor by a more powerful, but often disagreeable and pungent odor of their own. None have fully met the requirements of the case. Very recently, however, there has been a

ost important addition to our armamentarium for such purpo-
s, in the shape of a chemical known as salicylic acid. For the
nowledge of the remarkable antiseptic properties of this agent
e are principally indebted to Dr. Hermann Rolfe, of Leipsic,
ermany, who was led thereto from the fact that he succeeded in
aking it from carbolic acid and carbonic acid, through the
mbined action of caustic soda and moderate heat. His inves-
gations show that it scarcely has a rival as an antiseptic, and
t is inodorous, almost tasteless, and quite unirritating to the
ssues, having none of the pungent or escharotic properties of
rbolic acid.

One practical difficulty in its employment as a disinfectant of
partments, is its sparing solubility in water. European author-
ies advise the addition of phosphate of soda, as greatly increas-
g its solubility.

Mr. Shinn, however, a well-known pharmacist of Philadelphia,
as discovered, as the result of experiments with a large number
solvents, that borate of soda, commonly known as borax, is
ry much more efficient.

This salt is the more desirable for this purpose, from the fact,
t recently pointed out, that it is itself a powerful antiseptic.
licylic acid, as an atmospheric purifier, should be dissolved
ith borate of soda, in the proportion of a drachm of each to
ree ounces of water, and distributed throughout the air of the
artment of the sick room by means of an atomizer. These
icles may be obtained at any well regulated drug store in the
untry.

WATER AS RELATED TO DOMESTIC HYGIENE.

The place which water occupies in domestic hygiene is so im-
rtant and extensive, that volumes would be required to give
e subject that fullness of detail that would be desirable in a
mplete treatise on hygiene. We shall, therefore, in this report
iscuss only such points as are of primary importance and de-
and the attention of all.

All water comes from the atmosphere. There was a time when
ere did not exist any water in the liquid form on the surface
the earth. But as the earth has gradually cooled, the atmos-
here has become less able to hold the watery vapor dissolved,

until now at the ordinary temperatures it contains but a very small per cent., and this is constantly varying with the changes in temperature and position.

Water vapor becoming condensed by change of temperature falls as rain in a very pure condition, and is returned to the air as vapor by various means, thus keeping up a constant and unbroken circle. Some of the water, as it falls, runs off into streams; some evaporates directly; some is absorbed by vegetables, and the rest soaks into the ground by its own weight and the force of capillary attraction, until it reaches an impermeable strata. Thence it follows the dip of this strata, and is discharged by springs to the rivers and ocean, where evaporation is rapid and constant.

For domestic uses water is obtained by sinking wells down toward the strata upon which the water lies, or through them, producing artesian wells, or from natural springs or rivers.

As rivers receive the water which washes the surface of the land, as well as spring water, river water contains a greater variety of impurities than any other. Spring or well water contains only those soluble substances which exist in the soil where they are located.

In selecting a site for building purposes, public or private, one of the first things to be considered is the water supply.

In the country where the land in the vicinity is kept clean, and no manures are used, and the soil contains no poisonous minerals, well water or spring water is always pure and healthy.

But in cities where the ground is covered by and saturated with poisonous organic and inorganic matter, *well* (or *pump*) water is not pure enough for domestic use, and we could not recommend it for such purposes.

We have not as yet been able to investigate the water supply of the different towns and cities of our State, but in regard to the water supply of Camden, we can say that it is taken from the Delaware river, and was purer last summer than that of Philadelphia taken from the Schuylkill, though our river is poisoned by the drainage of six large cities, which deposit tons of organic matter into it as it ebbs and flows.

Camden is situated upon an alluvial deposit and partly on "made" ground, very poorly adapted for wells. Some fifteen or twenty years ago there existed one or two good springs in the

ity, but these have been destroyed. There are in Camden a number of pumps, which are not healthy, though much used. We noticed three cases of typhoid fever which appeared traceable to one of them.

On Mickle street, above Third, there is an artesian well. This well is about eighty feet deep, and passes through two or three strata of clay. Between these clay strata there were sandy, water-bearing deposits, but the water appeared to be surface water, and was offensive to the taste and smell. The water, which rises in this well to within a few feet of the surface of the ground, has the appearance of having come from the Delaware river by percolating through its bed, and was very good, but now seems to be contaminated by surface water, perhaps through some imperfection of the tube. Here I would especially call attention to a fact that seems almost, if not entirely, lost sight of by well-makers, namely, that when a well wall or tube passes through impermeable strata, as clay or rock, which has above it surface water of inferior quality, *water-tight* connection must be made between the wall or tube and this impermeable layer, or there will be contamination. The wall must also be completely water-tight from bottom to top.

Perhaps one of the best ways to provide water for domestic purposes is to collect the rain from the roofs of houses, or from surfaces made for that purpose. This has been demonstrated at Atlantic City, for last summer the best water I found at any place was there, where the inhabitants depend altogether upon the roofs for fresh water. The first washings from the roof should not be allowed to run into the cistern.

The average yearly rainfall throughout the State of New Jersey is about thirty inches, but varies in different parts, some towns receiving six inches more than others.

The average yearly fall in Camden is about forty-four inches. This amount has varied as much as twenty inches in different years.

In calculating for a water supply from rain, the yearly rainfall and the longest period of drought are important factors.

It is usually calculated that one person requires about twelve gallons of water per day for all purposes, though in some places a supply of three or four gallons is all that is had, but of course the people are not cleanly. In large towns and cities there is

generally allowed about ten gallons daily per individual for domestic purposes, ten for public and ten for manufacturing purposes, and forty gallons per head is even supplied in many cities.

A healthy adult requires daily about 85 ounces of water as drink and in food as a nutritive. The other demands, such as cooking and personal cleanliness, vary much according to the individual. Cleanliness is not only next to godliness, but is absolutely necessary to health, and, from Hippocrates down, every intelligent physician has recommended water bathing, both as a prophylactic and curative agent, when properly used. How few persons seem to appreciate the value of the *bath.*

In this respect the ancients shame us, for their arrangements for bathing were among the most important and extensive works in all towns and cities, and the remains of some of the ancient public baths exist to-day as monuments of art and culture.

Water, in a state of purity, is a compound of oxygen and hydrogen, containing 8 parts, by weight, of oxygen to 1 part of hydrogen. This oxide of hydrogen is what the chemist calls pure water; and for many of the purposes of chemistry it is necessary to obtain it as nearly as possible in this condition of absolute purity. This is usually effected by distillation, more or less frequently repeated, according to the degree of purity required. But when speaking of water as applied to drinking and culinary uses the term has a somewhat different signification. A water which appeared bright and clear, and possessed an agreeable taste, would be by most persons called pure; and if it contained none of those injurious substances that are undistinguishable to the taste, it might be considered pure, as far as all domestic uses are concerned. Chemically pure water is not an agreeable beverage. The sparkling appearance and slightly pungent taste of good drinking water is due to foreign substances which it contains in solution. All natural waters, whether obtained from springs, rivers, lakes or wells—even rain water itself—contains these foreign matters to a greater or less extent. It is the *nature* and *quantity* of the impurities that constitute the difference between good and bad water.

The purest natural water is rain water, when obtained as it falls directly from the clouds, without having come in contact with any terrestrial object in its passage downward to the earth. The first portions that fall are contaminated with dust and other

atters that are always floating in the atmosphere, and this is pecially the case in and about populous localities.

After the rain has fallen for some time the air becomes in a eat measure cleansed from these floating particles, and the ater may then be collected, free from solid impurities. It, owever, contains varying proportions of oxygen, nitrogen and rbonic acid gas, which it dissolves in its passage through the mosphere; and, in addition to these, traces of ammonia and itric acid are almost always to be found in rain water.

In natural waters obtained from terrestrial sources, more or less lid matter is always present. These dissolved solids vary in mount from less than one grain to several hundred grains in a allon; in some saline springs even amounting to 20 or 25 per nt. of the total weight.

Much of the rain that falls upon the surface of the earth is bsorbed by the porous soil, which contains much soluble mat- r. The water, in its downward percolation, dissolves portions f this soluble matter, the quantity usually increasing with the epth to which the water penetrates. For this reason the water f springs and wells generally contains much more dissolved atter than surface water. The water of rivers and lakes usually ntains a much smaller proportion of dissolved solid matter an that of springs and wells.

But the impurities of water may consist not only of substances solution, and therefore invisible, except by the color they some- mes impart, but also of matter mechanically suspended. Run- ng streams are obviously subject to this kind of impurity, for the ater of springs in its percolation through the earthy strata be- mes completely freed from suspended matter, and issues clear d sparkling; while in a running stream, the action of the ater on its banks and bed tends to disturb and carry away the aterials of which they are composed, the motion of the water the same time interfering with the subsidence of finely divided atter that may be washed into it. In streams possessing a pid current the amount of mineral substances thus carried wn is frequently enormous. "The water of the Mississippi ntains forty grains of mud to the gallon; and it is estimated at this river carries four hundred million tons of sediment per num into the Gulf of Mexico. The Ganges is said to carry wn 6,368,000,000 cubic feet annually."

The impurities contained in natural waters are very numerous, as may well be supposed from the complex character of the crust of the earth, and the great variety of substances with which the water comes in contact. Springs whose waters contain mineral constituents in so great a proportion as to be plainly evident to the taste, as well as to produce a decided therapeutic effect upon the system, are known as mineral or medicinal springs. But the limits of this report prevent us from going beyond the consideration of those impurities that are liable to be present in water used for domestic purposes. The most common of these are sulphates of soda and lime, chlorides of potassium and sodium, bicarbonates of lime and magnesia, sometimes iron, and occasionally lead, which may be dissolved by the water in its passage through leaden pipes.

The hardness of many kinds of spring and well water is mainly due to the presence of sulphate or bicarbonate of lime, or both. These salts decompose the soap used in washing, forming an insoluble compound, and destroying its detergent properties. When bicarbonate of lime alone is present in the water its hardness is destroyed by boiling. A portion of the carbonic acid is driven off by the heat, and the lime converted into a neutral carbonate, which is insoluble in water and does not decompose soap.

The bicarbonate of lime may also be removed by the careful addition of lime water. This, by combining with the excess of carbonic acid, converts the whole of the lime into carbonate, which, being insoluble, is precipitated. For this reason, the presence of bicarbonate of lime in water constitutes what is termed temporary or removable hardness. Sulphate of lime is, however, not removable by boiling, and therefore this salt makes the water permanently hard. The presence of these salts to a moderate extent does not injure a water for domestic purposes. Most sanitary authorities are of the opinion that "water of moderate hardness is preferable to a very soft water" for domestic uses. The proportion said to be most desirable is given as about 6 grains of carbonate of lime to the gallon. The French authorities are so well satisfied of the superiority of hard water, that they pass by that of the sandy plains, near Paris, and go far away to the chalk hills of Champagne, where they find water even harder than that of London; giving as a reason for the preference that

nore of the conscripts from the soft water districts are rejected on account of the want of strength of muscle, than from the hard water districts; from which they conclude that the calcareous matter is favorable to the formation of the tissues.

In addition to these solid matters, good water contains varying proportions of atmospheric air, and carbonic acid gas, to which it mainly owes its sparkling appearance and pleasant taste. But it is only in small quantities that these saline constituents are beneficial. The presence of lime or magnesia salts in large proportion is liable to produce dyspeptic and other affections.

"It is said that horses acquire a rough coat if supplied with water containing a large quantity of sulphate of lime. Goitre and cretinism are attributed to these impurities in water; at least the facts observed make this inference extremely probable. The goitre appeared in the Durham jail, afflicting a large proportion of the convicts. The spring water with which they were supplied was analyzed and found to contain 77 grains of lime and magnesia salts per gallon. On substituting for this a water containing only 18 grains of these salts, it was found that the old cases rapidly improved, while no new cases made their appearance. In the limestone districts of England, Switzerland, and Central New York, this goitre has been traced over considerable areas. At Goruckpoor, in India, where the waters are quite calcareous, 10 per cent. of the adults are afflicted with goitre, and many of the children are cretins. Even cats and dogs are said to be affected with cretinism. It is a curious fact that in Ireland, on the Waterford side of the Suir, where sandstones and slates prevail, goitre and cretinism are almost unknown, while on the Kilkenny side, where limestones abound, goitre is not uncommon.

"The products of the decomposition of animal matter in water is, however, the most objectionable impurity. Organic matters produced by the decomposition of vegetable substances are not especially dangerous, but the products of decomposing animal substances are highly dangerous, even when in minute quantities. These impurities do not make themselves apparent to the taste. On the contrary, such waters are frequently considered unusually fine in flavor, and persons go a great distance to procure them. Nevertheless, they contain an active poison. Many diseases of the most fatal character are now traced to the

use of water poisoned with the soakage from soils charged with sewage and excremental matters. Sudden outbreaks of disease of a dysenteric character are often caused by an irruption of sewage into wells, either from a break in a sewer or cesspool, or from some peculiarity of the season. Such contamination of the water is not indicated by any perceptible change in the appearance of the water. The filtered sewage, clear and transparent, carries with it the germs of the disease."*

Prof. Chandler thus enumerates the characteristics of a good drinking water:

"Its temperature should be at least 10 degrees lower than the temperature of the atmosphere, but it should not be much lower than 45 degrees, Fahrenheit. It should be free from taste, except, perhaps, a slight pungency from oxygen and carbonic acid, which is an advantage. Taste is, however, a poor guide. When one becomes accustomed to a certain water, pure water tastes flat by comparison; 50 grains of chloride of sodium in a gallon would hardly affect the taste perceptibly.

"A third requirement is freedom from smell. This should not be apparent, even when a bottle is half filled with water, placed in a warm place for a few hours, and then shaken.

"It should be transparent; not that it is necessarily injurious if not transparent, but it is preferable to take our solid food in other forms. Sometimes water may contain peaty matter from swamps, or vegetable matter from new reservoirs, which is not necessarily unwholesome.

"With regard to the total quantity of impurities admissible in good drinking water, the Sanitary Congress which met in Brussels decided that water containing more than 35 grains of impurity in one gallon is not wholesome, and there should not be much more than one grain of organic matter. 35 grains is a large quantity for city water, though well-waters frequently contain more."

The published analyses of the Delaware river water at Philadelphia give the total amount of solids at about 3 or 4 grains per gallon, while that of the Schuylkill somewhat exceeds this in amount.

The most important points to be determined in the examination of water intended for domestic uses are: the degree of hard-

* Extract from a lecture by Prof. C. F. Chandler.

ness, the amount of sulphates of chlorides, and of organic matter.

The total amount of solids may be ascertained by evaporating a measured quantity to dryness, and weighing the residue.

The presence of lime salts is shown by the formation of a precipitate when solution of oxalate of ammonium is added: ("6 grains of lime per gallon gives a slight turbidity, 16 grains a distinct precipitate, 30 grains a large precipitate.")

If magnesia is present it is precipitated by adding ammonia and phosphate of soda to the water, after the lime is removed by the oxalate of ammonium.

A less delicate test for magnesia consists in the addition of ammonia alone to the water. "A good water should give only a slight haziness or none at all with ammonia."

Chlorides.—Acidulate the water slightly with nitric acid and add solution of nitrate of silver; a white curdy precipitate indicates soluble chlorides. The amount may be roughly estimated from the copiousness of the precipitate.

Sulphates—Acidulate with muriatic acid and add solution of chloride or nitrate of barium. A white, pulverulent precipitate shows the presence of sulphates in the water. "A good water should not give more than a slight haziness."

Organic Matter.—It would be impossible to describe in our present limits the methods employed by chemists for the determination of the kind and quantity of organic impurity in water. A simple and convenient method for its detection consists in adding to the suspected water sufficient solution of permanganate of potassa to impart a pinkish tinge. If oxidizable organic matter is present the permanganate will be decomposed and the color destroyed. The amount of permanganate decomposed by a stated quantity of water, and the rapidity of the action, is proportionate to the amount of organic matter present. This method, though by no means accurate, enables the amount of organic impurity to be estimated with sufficient accuracy for general purposes, especially if a comparative experiment be carried on at the same time with water of known purity. The presence of this kind of impurity may also be detected by evaporating a portion of the water to dryness, and subjecting the residue to a heat approaching redness. If the mass blackens, organic mat-

ter is present; and if an offensive odor is at the same time given off, it indicates that it contains material of animal origin.

Among the processes for the purification of water, filtration is the most commonly employed. But filtration through ordinary porous media, as sand, sponge, paper, &c., removes only those matters that are mechanically suspended in the water. For the removal of dissolved impurities other means must be resorted to.

When the impurities of water consist of an excess of soluble salts, it may be said that, in general, no practicable method of purification save that of distillation is known, except in the case of bicarbonate of lime, which, as before stated, is removable by simple boiling. But it is organic matter that constitutes the most insidious and dangerous impurity of drinking water. The well-known property which charcoal possesses of absorbing many organic matters, and the ease with which it may be obtained, render it peculiarly suitable as a purifying agent. "On this account water casks are generally charred on the inside to the depth of an eighth of an inch or so; and it is a common practice, when rain water cisterns become foul, to throw in a bushel or two of fresh charcoal." Many organic impurities are destroyed by boiling the water, and this is often adopted as a precautionary measure by travelers in malarious countries. Permanganate of potassa is one of the most efficient agents for the purification of water contaminated with organic matter. By the addition of a little of this salt to such water its impurities are oxidized, and destroyed as effectually as they would be by fire. Magnetic oxide and carbide of iron have been proposed as purifying agents, and by many authorities are highly recommended.

But for general use there is, perhaps, nothing better than the common charcoal filters. They have the advantage of being readily extemporized of materials always at hand. They are also now manufactured in various forms, and supplied to the market at prices so low as to be within the reach of all.

No water containing an appreciable quantity of organic impurity, especially where an animal origin may be suspected, should be used for cooking or drinking purposes without having been submitted to some one of these well-known methods of purification.

Report on Epidemics and Endemics

THAT HAVE OCCURRED IN THE STATE OF NEW JERSEY SINCE 1870.

BY THEODORE R. VARICK, M. D.

At the inaugural meeting of the State Board of Health, held in the city of Trenton, May, 1877, it was

"*Resolved*, That a committee be appointed to give a brief statement of endemics or epidemics that have occurred since 1870 in this State, and their causes, so far as ascertained."

The president appointed me as chairman, and Drs. J. E. Culver, of Hudson county, and Franklin Gauntt, of Burlington county, the other members of the committee.

The want of commissions for the collection of vital statistics was sorely felt, and the only source of information remaining, was a reference to the published reports of district societies, of which I gladly availed myself.

It is on occasions such as this that the system of annual reports, adopted by the State Society, exhibits its real value. By this system there is preserved a complete medical history of the State for each year, recording not only epidemics and endemics, but also individual cases of interest.

In making up this report I have culled from these communications facts bearing on the subject, for which this committee was appointed.

The medical year, according to the published transactions, runs from May to May, and I have adopted the same division in this report, as it would be impossible to separate each calendar year without creating inextricable confusion.

Extending over a period of seven years, the accounts of disease must of necessity be brief.

It will be perceived as we progress, that each county report is laid under contribution in alphabetical order, and if statistical information is deficient it is due to the facts already stated.

Burlington County.—There is reported an exanthematous disease with catarrhal and anginose symptoms, in an epidemic form.

There seems to have been a doubt as to whether the disease was scarlatina or epidemic roseola.

Dr. Townsend, of Beverly, states "the eruption was precisely similar to measles, and has been universal since its first appearance. Most of the cases have ulceration of the tonsils similar to that in scarlatina, followed by glandular swellings, and in some cases dropsical effusions."

Dr. Budd, of Mt. Holly, "is confident that it is epidemic roseola."

It seems to me that the occurrence of adenitis and dropsical swelling settles the question in favor of its being scarlatina.

Dr. Cooper, of Camden, reports an epidemic of scarlet fever.

"The epidemic at first was mild, but in a short time assumed a much graver character, and when it once entered into a family of children it was almost certain to attack every member, and in many instances adult members suffered as well.

In most of the fatal cases, where death occurred early in the disease, cerebral symptoms, succeeded by profound coma, were first developed.

Such cases were almost always fatal, the system seeming to sink under the depressing effects of the poison before the disease had time to run its natural course.

In another class of fatal cases, the patient passed through the febrile stages with safety, the throat being only moderately sore, and the tongue not all dry, except during the height of the fever; but after the stage of desquamation had been completed, the patient seemed to sink into a typhoid state, with a small, frequent and feeble pulse with dark offensive sordes collecting about the mouth and on the teeth, with an entire disgust of food, the little sufferer finally sank from debility and exhaustion, in spite of iron, tonics and stimulants, in some cases as late as the third or fourth week from the commencement of the attack."

Dr. Marcy, of Cape May county, reports an epidemic of influenza, formerly known as Tyler's grip, and remarkable for nothing except pertinacity.

Diphtheria is reported as having become endemic, being found at all seasons, and sometimes of decidedly malignant type.

From Essex county we have the report that "the nearest approach to anything like an epidemic has been scarlatina, which has prevailed to a greater or less extent, often with great malignancy, throughout the year, and especially during the summer and winter, and up to the present time.

In Bloomfield, Essex county, an epidemic of diphtheria is reported by Drs. Tinsley and White; the type seems to have been mild and but few fatal cases occurring.

Dr. M. A. Miller, of the Jersey City Charity Hospital, reports the occurrence of a number of cases of typhus and typhoid fever, "lingering with us for months; resisting, too, the most earnest efforts directed towards ventilation and disinfection."

There was no evidence that either fever originated in the neighborhood. On the contrary, the source of contagion was traced directly to vessels in the harbor.

The cases of typhoid all recovered.

The first case of typhus was recognized in a sailor who was admitted to the hospital February 4th, from the steamer Tripoli. The disease ran a mild course and the patient recovered.

From this case a nurse who was in attendance contracted the fever February 26th, and died March 4th.

The second nurse employed in the fever ward was seized with the fever April 2d, and died April 4th.

The fever in both cases manifested a very malignant type, running its course in a short period of time.

In the latter case the eruption was very abundant over the extremities, as well as the trunk, and appeared on the second day of the disease.

A patient was admitted to the hospital April 6th, with symptoms of fever, was placed in the fever ward, and on April 10th a very copious eruption of typhus made its appearance, which continued prominent for fourteen days, and then began to recede, disappearing in the course of two or three days, the patient convalescing rapidly.

Dr. C. W. Larrison, of Hunterdon county, reports that erysipelas prevailed as an epidemic in January, 1870. "Those attacked suffered extremely from pain, stiffness of joints, irritability of the stomach and general debility."

Dr. Henry R. Baldwin, of Middlesex county, reports a number of sporadic cases of scarlatina occurring during the fall of 1869, which in the following winter assumed an epidemic form.

"It was a noticeable fact that it appeared in the Romish school and attacked those brought into immediate contact; when having exhausted all the susceptible, it traveled to the public school of the district of New Brunswick, and numbered many victims among the attendants. The sequelæ were unusually severe, many cases of albuminous nephritis following the attacks."

Dr. E. M. Hunt, of Metuchen, writes: "This disease (diphtheria) has prevailed at times in epidemic form at various points in the townships this side of the Raritan, almost from the period when first it was known in our country as a primary affection. In the small village of New Market, some six years since, it showed great fatality, between twenty and thirty persons dying thereof, and many of them adults, and at many other places it has occurred with persistence."

In Monmouth county an epidemic of mumps is reported, which attacked both children and adults.

YEAR ENDING MAY, 1871.

Burlington County.—Epidemic roseola still continues to be the master epidemic. Its symptoms are sometimes grave, and differ widely from those of the common rose rash. Severe inflammation of the fauces, attended with exudation of much catarrhal matter, were sometimes the most prominent symptoms. Also, inflammation of the submaxillary glands, extending to, and ending in great tumefaction and suppuration of the cellular tissue, were occasionally seen. Sometimes a furfuraceous desquamation was one of the sequelæ.

From Camden county we glean the following: "At the period of the close of the report of last year we noticed the fact that scarlatina of a severe type had been prevalent almost as an epidemic in the city of Camden and some of the neighboring villages.

"The united testimony of physicians from all parts of the county agree in the assertion, that both intermittent and remittent fevers have been on the decline for several years, and in

some neighborhoods, where they were constantly met with every summer and fall, they have almost entirely disappeared."

This, so far as the city of Camden and vicinity are concerned, is justly attributed to a system of underground drainage. This system "is still being each year extended, with a manifest and decided improvement in the health of the inhabitants of the districts in which such improvements have been made."

At a meeting of the Cumberland County District Medical Society, the question, "Are miasmatic diseases produced by salt marshes?" was introduced before the society for discussion, and it was unanimously decided "they are not," every member present having something to say on the subject. Nearly all have more or less practice in the neighborhood of salt marshes, and the opinion of some was that the influence of salt marshes was beneficial in miasmatic diseases, through its tonic qualities.

The experience and opinions of the profession of Cumberland county are somewhat at variance with the report from Essex county, to whom the same question was propounded by the chairman of the Standing Committee of the Medical Society of New Jersey.

The report states that the extensive meadows lying between Newark and Elizabeth City, known as the "salt meadows," do produce all forms of miasmatic diseases.

This seeming inconsistency may be reconciled by taking into consideration the fact that the meadows alluded to are not purely salt, but the water is, to a great extent, brackish, and seems to be particularly favorable to the evolution of malaria.

This remark will also apply to the Hackensack Meadows, in the region of Snake Hill and throughout Secaucus, where intermittent fever is especially prevalent.

In Hunterdon county "an epidemic of typhoid fever occurred in this village (Ringoes) and vicinity, in the months of July, August and September, of a somewhat peculiar nature. The course of the disease was more rapid than that of any other typhoid epidemic that I have witnessed." The reporter, Dr. C. W. Larison, continues: "The emaciation was very rapid, but when the enteries morbi had been entirely eliminated the patient recovered rapidly." The cause of the epidemic was traced to "a stagnant pool, into which was thrown, from time time, dead hens, dead pigs, &c., and into which the fluids of the barnyard were drained."

Dr. W. W. L. Phillips, of Mercer county, writes: "There is a locality in Trenton, situated near the junction of the canal and feeder, familiarly known as the Swamp, which is inhabited principally by negroes. The ground is some six feet below the level of the canal, is naturally swampy, and is illy drained. During the months of July and August last there prevailed among the denizens of this locality a fatal disease, which gave rise at the time to considerable alarm and discussion. Some twenty negroes were attacked and died. The cases were nearly all fatal, some dying as early as the second day. The disease was undoubtedly a malignant malarial fever. A few cases assumed the hemorrhagic type, bleeding profusely from the mucous membranes.

"The white people living in the vicinity were not attacked by the disease. After proper drainage and policing of the malarious district the disease abated."

YEAR ENDING MAY, 1872.

Dr. Frank Wilmarth, of Essex county, reports the fact "that epidemic influences have prevailed to a considerable extent, over a large portion of the district, for the year ending May 1, 1872.

"From May 1, 1871, to April 26, 1872, nine hundred and thirty cases of small-pox were reported in the city of Newark one hundred and twenty of which proved fatal. The largest number (two hundred and three) occurred in May, 1871; the smallest (fifteen) in September. Between these three months there was a gradual decline in the number of cases. Since September there has been a gradual increase, the number in March, 1872, reaching one hundred and eleven.

"On the 20th of May, 1871, the same disease made its appearance in the city of Orange. From that time until the present (May 1, 1872,) seventy-one cases have been noted, sixty four cases occurring before the 3d of August."

Dr. Lloyd records the fact that "sixty-one cases came under his observation; of this number, thirty-seven only had ever been vaccinated. Twenty-four cases were fatal; of these seven had been vaccinated, fifteen had not been; while evidence concerning the remaining two in this particular was doubtful."

Two of the fatal cases occurred in puerperal women.

In four instances the patients had been revaccinated from four

to six days previous to being attacked, the vaccine disease appearing with its characteristic pustule, following its usual course.

In Hudson county, small pox prevailed principally in Jersey City and Hoboken.

Prior to the establishment of a small pox hospital on the county farm, at Snake Hill, all cases occurring among the pauper population were sent to the Jersey City Charity Hospital.

From May, 1869, to the end of December, 1874, there were admitted of varioloid 66 cases, of which one died, a mortality of 1½ per cent.; of variola, 325 cases were committed, 122 died, 203 recovered, leaving a mortality of 37½ per cent.

A large proportion of the fatal cases were of the hemorrhagic variety, and several dying of œdema glottidis and others of pneumonia supervening during the attack. Its greatest prevalence was from December, '71, to December, '73.

Outside the hospital, its habitat was mostly in the more filthy parts of the city, and those portions occupied by tenements which, as is usually the case, were crowded to excess, and in a condition for the germination of disease in any form.

In Mercer county, in the month of July the city of Trenton "was invaded by an alarming epidemic of small pox. It first made its appearance in the central part of the city, in the most thickly populated portion and among the better class of citizens."

"It seemed for a time to be confined within a narrow circle of the business portion of the community; but, notwithstanding every precautionary measure was immediately taken by the Board of Health and the Common Council, to prevent the spread of the disease, it gradually spread until isolated cases were found in almost every part of the city.

"The disease was of a very severe type, and the number of deaths, in proportion to the number of cases quite large, being about one in six."

During the month of August small pox made its appearance in the city of Camden in a locality inhabited mostly by colored people.

The hygienic condition was particularly bad.

The houses and yards were small and filthy, with pig-pens and privy-wells often overflowing in close proximity to the houses, and a large portion of the population unprotected by vaccination.

Of a necessity the disease spread. By a thorough "policing" of the locality the disease was temporarily held in abeyance until October, when it spread to the surrounding districts.

At this time the disease existed in an epidemic form in Philadelphia.

To the constant intercourse of the inhabitants of the two cities is attributed the increase of the number of cases in Camden.

In the small-pox hospital the mortality reached 18.02 per cent., while in those cases treated in their own homes the fatal cases reached 16.04 per cent.

The mortality among the unvaccinated amounted to 37 per cent.

"Most of the deaths among those who had been vaccinated were from some intercurrent disease."

Dr. Goodell, of Sykesville, Burlington county, reports the following history of an endemic in his neighborhood: "The village of Pointville, which was visited by a peculiar form of fever during the summer and fall of 1872, contains about thirty families, composed of mechanics and laboring men, noted for their temperate habits and the cleanly and tidy appearance of their dwellings. Its elevation is about 160 feet above tide-water, and is the highest elevation, within an area of several miles, with good drainage.

"The soil is aluminous and fertile, bordering on white sand formation, which covers the surface of the pine region.

"There are no swamps or marshes sufficiently near to damage the salubrity of the village.

"This endemic numbered about fifty cases, sparing neither age nor sex. A general feeling of lassitude and headache was succeeded in a few days by a protracted chill, followed by a dry, hot skin, a feeble, irregular pulse, rarely under 120, attended with nausea and vomiting, with increased headache, pain in the eye-balls and intolerance of light.

"Delirium often accompanied this stage with extreme wakefulness, which, in some cases was succeeded by stupor approaching coma. The pupils would contract under a strong light, then dilate before the light was removed. The bowels were generally constipated, but readily responded to a mercurial cathartic. An unsatisfactory convalescence would sometimes commence about the ninth day, dating from the chill, but this was often followed by a relapse, protracting the case to five or six weeks. Some-

times pneumonia, either in an active or latent form, would complicate the case after the second or third week. The red tongue of typhoid fever was absent, and though they had irritable stomach and pain on making pressure over different parts of the abdomen, I never observed tympanites nor hemorrhage from the bowels. The skin was often examined for petecchial spots. Other practitioners who attended some of the cases thought they discovered indistinct traces of this specific eruption.

"Regarding the disease as a cerebro-spinal fever, with a strongly marked typhus tendency, much depletion, even in the commencement, was not ventured. I ought to remark that the cases which occurred were shared with four other practitioners, whose success was equal to my own, however much we might differ in theoretical views or therapeutic measures. I report but one fatal case, caused by a neglected pneumonia after convalescence seemed to be established."

Cumberland County.—Dr. R. M. Bateman reports: "An extended epidemic of scarlet fever raged throughout that section (Cedarville and Fairton, Cumberland county) during the latter part of the winter (1873–4), particularly fatal in the neighborhood of Fairton, also at Greenwich, in the same county. In the greater portion of the fatal cases, brain symptoms seemed to predominate. Adults as well as children suffered from the disease.

"Mumps prevailed epidemically in many parts of the county."

Dr. Love, of Montclair, Essex county, has met with a number of cases of typhoid fever, which, although not in an epidemic form, were so directly traceable to recognized causes that I give his report in full:

"All of them caused by either defective water closets in houses, or by want of cleanliness in reference to drains, privies or cellars."

"That in this day of enlightenment, as to the commonest rules of sanitary science, architects should plan and people should build expensive houses, in which and around which are water-closets, sewers and privy vaults, whose foul emanations pollute the air and the drinking water of the inhabitants, is to me a thing incomprehensible. To my personal knowledge, many an elegant villa and beautiful country residence is so constructed that the stench from the pipes leading to the above-mentioned receptacles is such that the servants can scarcely endure to use stationary wash tubs, and the opening of the lid

of the slop-hopper in the second story fills the room with an abomination of putrescence. The servants have intermittent, madam has neuralgia, dyspepsia, and a host of ailments; the children have gastric fever and diphtheria, and they all wonder why country air don't agree with them. They go to the seaside in the summer, and to the city during the inclement winter months; the house is shut up, and a man servant is left to take care of it, who sleeps in the hall bed-room nights, and has typhoid fever. As it is impossible for running streams to purify themselves when polluted with sewage, so it is impossible for human beings to live with such surroundings and not contract disease."

YEAR ENDING MAY, 1874.

In Jersey City puerperal fever prevailed during the early part of the year to a considerable extent; in fact it assumed an epidemic character, continuing through a period of several months.

Quite a number of cases proved fatal, especially in primiparus, yet many recoveries serve to mark the mildness of the disease towards the latter part of the epidemic.

In reference to the subject, Dr. M. A. Miller, of Jersey City, writes: "Experience suggests that a distinction may be drawn between the cases as they have occurred. In severe attacks, terminating fatally, a post-mortem examination has invariably revealed extensive peritonitis, with puriform collections coexisting with hysteritis. In other cases the mildness of the symptoms would indicate that the inflammatory process has been limited to the proper tissues of the uterus, or involving also the uterine appendages; when such attacks have terminated in resolution and recovery, it may have been without exposing the organs to serious injury, or limiting the injury to adhesions between contiguous portions of the serous membrane. If, however, the fallopian tubes have been involved in the inflammation, the cavity of one or both may be obliterated, preventing altogether their ordinary functions. The following symptoms have been noted in connection with the cases under observation:

In the milder cases ending in recovery, the disease has been found to commence usually on the third or fourth day after confinement, and generally with rigors, followed by heat of skin,

thirst and headache, the heat of skin soon subsiding, the pulse rises in frequency to 100 or 110, the tongue dry and furred, and to these symptoms succeed nausea and vomiting and increased sensibility of the uterus.

As the disease advances the abdomen generally becomes tympanitic. The lochia are sometimes suppressed for a few days, and often fetid. The secretion of milk is usually arrested for the time. In one case convalescence was established within two weeks; in other cases deferred until the third and fourth week; but weakness and debility have been found to linger longer with the patients. In the more severe cases, the invasion of the disease on or before the third day after delivery has been marked by rigors, followed by heat of skin, thirst, flushed face, quickened pulse, and hurried respiration; the heat of skin, however, subsides under free perspiration, and during the further course of the disease may not exceed the normal standard.

These symptoms are soon followed by nausea, vomiting, pain in the head and tenderness in the iliac region. The patient early complains of pain in the abdomen, which generally commences in one of the iliac regions, and especially the right, radiating over the abdomen. Shortly after the disease is established, the abdomen becomes tumid and tympanitic; the tympanitis being due to air contained either in the intestines or peritoneal sac. The lochial discharge is usually suppressed early in the attack, returning after a few days changed in color and offensive in odor. The secretion of milk is suspended. The pulse is uniformly frequent throughout the disease, ranging from 110 to 140 generally small and wiry, but often feeble. The tongue may be found coated with a whitish fur in some cases, while in others it is dry and brown in the centre, with a white fur at the edges. The stomach is disturbed at a very early period, and the nausea and vomiting continue at intervals throughout the attack. Obstinate constipation marked most of the cases. The intellectual faculties have been but rarely affected; the patient retaining her consciousness and senses till very near the end.

A fatal termination has been usually found from the fifth to the tenth day from the invasion of the disease. In the several post-mortem examinations held at the Jersey City Charity Hospital, great uniformity has been observed in the morbid appear-

ances. On opening the abdomen, which, as a rule, was swollen and tympanitic, the intestines were found greatly distended with gas. The peritoneum generally exhibited signs of inflammatory action, being more or less vascular, especially that portion covering the uterus. The peritoneal sac contained a large quantity of a thick, yellowish, white-colored fluid. The omentum was reddened and congested, and covered by thick layers of pus, with layers of lymph agglutinating the omentum and intestines together. The uterus was surrounded by puriform matter, and not manifestly enlarged, but usually contracted to nearly the normal size. In opening the uterine cavity, false membranes of coagulable lymph, mixed with blood and lochia, were found on the lining membrane, which was thickened and congested. In all cases the lining membrane of the fallopian tubes was reddened and congested throughout."

Dr. J. L. Bodine reports from Mercer county that "Whooping cough, mumps, scarlet fever and measles have prevailed in an epidemic form during the year. In the month of November the State Normal and Model Schools were closed on account of the prevalence of scarlet fever. Whooping cough was the epidemic of the summer, mumps of the fall, and measles of the winter months, although these diseases have been distributed through the other seasons of the year.

"Trenton is largely engaged in the manufacture of pottery ware, and the nature of their employment produces certain forms of disease in the operatives in these works. Lead enters largely into the glaze upon the ware, and cases of lead poisoning are not infrequent.

"A peculiar form of pulmonary disease, known as potters' asthma and potters' consumption, is caused by inhaling the small particles of clay, quartz, plaster of paris and other articles which float in a pottery atmosphere. Chronic bronchitis, emphysema, dilated bronchia, consolidation and destruction of lung tissue result Post mortem examinations show cavities of various sizes in the lungs, and obliteration of the ultimate vesicular structure of the lungs."

In Monmouth county we have reported an epidemic of diphtheria of the most malignant and fatal character, prevailing during the winter months.

YEAR ENDING MAY, 1875.

Dr. Frank Wilmarth, of Essex county, reports: "In the central part of the county epidemics of parotitis and diphtheria have appeared, the former somewhat extended. Cases of the latter affection were not so numerous, but a majority were severe. In Orange and its vicinity it hovered about low, poorly drained localities almost entirely, leaving but little doubt that its origin holds a close relationship with unfavorable sanitary surroundings. The attending physician, in one instance where several members of a family had been attacked, found the drinking water from the well markedly impure, as evidence in smell and taste, and in the deposit of a sediment in which the microscope discovered a fungous development analagous to, if not precisely like, that which has been observed in the exudation characteristic of the malady. The well was in close proximity to a cesspool, whose impurities had found easy access to the water. Long before the diphtheritic troubles were encountered, the family had noticed the unnatural features of the water; but persisted in its use, ignoring the notion that nauseous odors and tastes are bestowed for a benevolent purpose."

From Dr. Chas. F. Deshler, of Mercer county, we learn that "epidemic diphtheria prevailed in the eastern portion of the county from November to April. According to the testimony of the neighboring physicians, in the vicinity of Hightstown alone there occurred more than one hundred cases."

YEAR ENDING MAY, 1876.

Dr. A. S. Burdett, of Hackensack, Bergen county, writes: "Diphtheria has been rife; its fatality in some localities fearful."

Dr. D. A. Currie, of Englewood, writes: "During the month of December, 1874, and January, February March and April, 1875, diphtheria raged to an alarming extent in this valley. The disease was uncomplicated diphtheria, and proved fatal sometimes by the accession of croup consequent upon the extension of the disease into the larynx and trachea; at others by exhaustion.

The first case occurred in a family of five, living in a large tenement, all of whom had the disease. The case died.

"The family being Irish, the usual 'wake' was held, although three other cases were found to exist at the same time. In three days afterward twenty-eight cases were found in families who had sent delegates to the 'wake.' From this time until about the middle of April there were new cases occurring almost daily."

Dr. C. reports 135 cases as having occurred in his practice, within a period of five months.

In Essex county, in the city of Newark and suburbs, diphtheria raged during the colder months, and also in Montclair, proving fatal in a large number of cases.

"In the neighborhood of Paulsboro, Gloucester county, diphtheria has prevailed as an epidemic, for a time very fatally."

In Hudson county, diphtheria prevailed extensively during the whole year. No locality was exempt from its attack, although it was particularly fatal in damp, illy ventilated and filthy localities.

It is reported that it comprised 17.4 per cent. of the entire mortuary record for the year. In reference to the fatality of the disease, the percentage was 32 for the fall, 29 per cent. in winter, 21 per cent. in summer, and 18 per cent. in the spring.

In Hunterdon county, Dr. M. Abel writes that in the region of Quakertown "diphtheria has prevailed almost the whole year. The type of the ailment has been mild, and from it there have resulted but few deaths."

Dr. D. C. English, of Middlesex county, reports that "diphtheria has never, we believe, been so prevalent and of so malignant a type as in the city of New Brunswick and in South Amboy; and we think it owing largely to the neglect of the adoption of proper hygienic or sanitary measures for the prevention and mitigation of disease.

"During the past five or six months there have been according to the statements of our undertakers, over 250 deaths from this disease in New Brunswick; and we reckon, from the meagre statistics we have been able to collect, that the mortality has been about 20 per cent."

In South Amboy, according to the accounts given by Dr. Treganowan, the ratio of mortality was about the same.

"The instances were exceedingly rare where children under eighteen months have taken the disease, the vast majority having

been from three to ten or twelve years, between which ages was also by far the greatest mortality. Adults almost invariably recovered, some of whom were severely attacked."

In Monmouth county "diphtheria of a malignant type has prevailed at Long Branch and vicinity with great mortality, leaving few families who do not mourn the early departure of some little one, and in some cases it has counted all among its victims."

In Morris county diphtheria prevailed as an epidemic at Rockaway, Boonton and Middle Valley. In the vicinity of Rockaway there were about one hundred and fifty cases, with a mortality of twelve per cent. At Middle Valley there were perhaps forty cases. At Boonton there occurred thirty-five cases, with a death rate of twenty per cent.

In Sussex county, Dr. Moore, of Deckertown, records an epidemic of diphtheria during the preceding winter and spring.

In Union county, in the city of Rahway, there is reported an epidemic of diphtheria of a mild type, with a small rate of mortality.

There is also reported an epidemic of the same disease at Oxford and in the borough of Washington, in Warren county.

YEAR ENDING MAY, 1877.

In Mercer county diphtheria prevailed throughout the whole county. In Hightstown, Dr. Deshler reports, that "it assumed epidemic proportions during the fall and winter ('76–7) with an average fatality of about twenty per cent. Sporadic cases of this disease had been in the neighborhood during several preceding years, the last one occurring some six months before the appearance of the epidemic."

Dr. D. further reports, "reliable testimony places the number of cases of diphtheria at one hundred and forty; probably had all the cases been reported the number would not be below one hundred and sixty, distributed through fifty-seven families.

"There were thirty deaths, divided among twenty families.

"*Origin.*—The first cases appeared in July, shortly after a warm rain, in several families living in the same locality.

"The land is low, with an impervious subsoil, is water soaked except when drained by artificial means, has a small brook run-

ning through the centre of it with low banks, on which portion of the town is situated; the houses are mostly wit underground cellars, or if there are such they are always except where protected by cemented walls.

"Without entering into details, we may justly say, that at examination the condition of the streets, yards, and outho with few exceptions, were decidedly unsanitary. The brook so obstructed in many places by accumulations of refuse fæcal matter as to change it from a running stream into a pools of filthy water, exhaling offensive vapors. An impor drain also was found partly obstructed by putrefying animal vegetable substances.

"Effluvia from these sources vitiated the surrounding at phere and rendered it decidedly unwholesome.

"*Nature of the Soil.*—In an attempt to determine the influ exerted in the production and propagation of this disease by character of the soil, the following was noticed:

Of the 57 house infected

16 had good natural drainage.

41 had not good natural drainage.

Artificial drainage rarely received adequate attention. ther examination revealed:

15 houses with dry cellars in which were 40 cases.

12 houses with wet cellars in which were 29 cases.

30 houses with no cellars in which were 71 cases.

Deaths are distributed as follows:

9 in houses with dry cellars.

8 in houses with wet cellars.

13 in houses with no cellars.

"*Social Relations.*—These include the conditions of domesti as regards space, food, air, clothing, vocation, habits, etc., and estimated as follows:

12 families with 29 patients, good.

9 families with 25 patients, ordinary.

34 families with 84 patients, bad.

Deaths as follows:

8 with social conditions good.

22 with social conditions not good.

"*Seasons and Weather.*—Deaths occurred as follows:

2 in July.

3 in August.
2 in September.
7 in October.
7 in November.
1 in December.
2 in February.
1 in March.
2 in April.
1 in May.
2 not known.

"The 79 cases recorded, are distributed as follows:

22 in August.
4 in September.
33 in October.
4 in November.
7 in December.
4 in January.
4 in February.
1 in April.

"*Contagion.*—In 29 families, which may be taken as a type of all affected, 23 received it by contagion; 5 not known, though contagion probable; 1 contagion not probable, as the house was located in the suburbs, to which the children had been scrupulously confined.

A majority of the cases traced their origin to the public schools, and as these are efficient agents of communication in this, as well as all similar diseases, it is a question whether the closing of them under these circumstances should not be imperatively demanded.

"*Forms.*—Seventy-nine recorded cases show variations of form as follows: Twenty-eight of catarrhal variety, in which the constitutional symptoms were mild, the exudation limited in extent and confined to the tonsils; fifty-one of the croupous form, in which the constitutional disturbance was marked, the exudation copious, and extending to the other portions of the throat. In forty-three of these it was confined to the pharynx; in five, extended into the nasal passages, and in three into the larynx.

"Terminations—Nine in death:

3 from croup.
5 from direct effects of the poison.

1 from the sequelæ, hemiplegia.
22 in paralysis:
6 muscles of the neck.
8 muscles of the extremities.
5 muscles of the soft palate.
2 muscles of the eyes.
1 hemiplegia.

The Doctor concludes with the following resume:

"*Houses*—
26 per cent. with dry cellars.
21 per cent. with wet cellars.
53 per cent. with no cellars.

" *Nature of Soil*—
28 per cent. good natural drainage.
72 per cent. not good natural drainage.

" *Social Relations*—
22 per cent. good.
16 per cent. ordinary.
62 per cent. bad.

" *Deaths*—
30 per cent. in houses with dry cellars.
27 per cent. in houses with wet cellars.
43 per cent. in houses with no cellars.
27 per cent. social relations good.
73 per cent. social relations not good.

" *Contagion*—
79 per cent. traced to contagion.
21 per cent. not traced to contagion.

" *Results*—
20 per cent. terminated in death.
28 per cent. terminated in paralysis."

In the practice of Dr. Newell in the western section of Mo

mouth county, diphtheria is reported as being unusually malignant, and assuming in many cases a croupous form.

The reporter from Morris, referring to a previous report, writes that diphtheria began to prevail at Middle Valley in the fall of 1875, and during its subsidence, at the present time, 1877, was attended with a mortality of about 8 per cent.

There is also recorded the interesting fact that the town of Chester, only five miles distant, was not attacked until September, 1876, notwithstanding the constant intercourse between the two towns.

The disease reached its climax about the first of January following.

Although many of the cases were of a severe type, the death rate was small. "In the winter of '75–'76 it was quite prevalent in Morristown, and yet it did not reach Whippany, a village only four miles distant, until August last, when it appeared in a most malignant form. At first the death rate was 100 per cent., but the disease became much less severe in type, and began to subside in December.

Dr. Miller, the resident physician, reports twelve cases under treatment since the first of January, all ending in recovery.

About 10 per cent. was complicated with paralysis of one part or another. The paralysis continued for periods, varying from a fortnight to three months, and in a few instances complete muscular use was not obtained until a much later time.

MALARIAL FEVERS IN HUDSON COUNTY, BEING A PART OF THE REPORT ON ENDEMICS AND EPIDEMICS. BY J. E. CULVER, M. D.

Malarial fevers are to be found at all times in all parts of Hudson county. Remittents occur oftenest in the low lands; intermittents abound everywhere. Their prevalence is, however, observed to vary with the changing seasons; for example, the cold weather of winter diminishes the attacks to the minimum number, spring and summer increase them, and the maximum is reached in the early autumn months. During my service in St. Francis Hospital this year, throughout which the number of patients in hospital remained nearly the same, there were treated ten cases of malarial fever in January, eleven cases in May, and forty-one cases in September. In October just past,

there were thirty cases in the same hospital. The different types of malarial fevers are somewhat interchangable, and in no wise do they habitually conform to the strict classical descriptions of them. An intermittent under bad management may become remittent; and a remittent under proper treatment may become intermittent. So likewise may quartans and tertians become quotidians, and vice versa. There occur, indeed, occasionally, both ephemeral and mild continuous fevers of malarial origin. In process of rapid recovery, all types soon become indistinguishable.

In the mortuary statistics, published by the Hudson County Board of Health, thirty-three deaths in 1875, and twenty-three deaths in 1876, are ascribed to remittent fever. Possibly these are but so many errors of diagnosis; for the Health Board has to accept all "pathists" and midwives as competent to sign burial certificates. In a practice of almost thirty years, I have never met with a death from malarial fever, except three or four fatal cases of pernicious intermittents. These "congestive chills," as they are styled, occur very rarely, and, as far as my experience goes, they destroy only youths of great vascularity, full of blood and lymph, mostly females about the period of commencing menstruation. The fever begins as a mild quotidian, the fatal chill taking place on the second, third, or fourth day, initiated by a marked venosity of the blood, and ending tragically in sudden and profound collapse.

Perhaps the most conspicuous of all the characteristics of malarial fevers, is their tendency to recurrences, or relapses. If a patient under successful treatment for intermittent fever, discontinued his remedies immediately when the fever is "broken," it will, in most cases, return in one, two or three weeks. Every resident of Hudson county is perpetually made conscious of malarial influences in his own person; and he is fortunate indeed who does not suffer every year from repeated attacks of fever. An old gentleman, a native, intelligent and observant, once told me, that for sixty years he had averaged a renewal of his periodic fever not less than twice yearly. The theory of acclimatization is here totally fallacious; none are exempt. The converse maxim, namely, that the more one has suffered from malarial influences the less power he has to resist them, is nearer the truth. Accordingly, change of climate is a most efficient remedy.

memorable in the medical world, that, not very long ago,
t was put forth to contradistinguish "Relapsing Fever"
ll other fevers; but the symptoms and peculiarities on
its differentiation was sought to be established, are not
aaterial than are contrasts which present clinically be-
lifferent cases of the same fever; and its most distinctive
. the ralapse, furnishes strong presumptive proof of its
/ with fevers of malarial origin. The relapse indicates
e pathogenic agent acts continuously.

victims of malarial influences are subject to all the vicis-
of our ever-changing climate, and they embrace a multi-
persons who have already acquired pathological condi-
om causes both climatic and non-climatic. These com-
ıg circumstances appear quite sufficient to account for the
limitless range of symptoms, their varied prominence
ually and relatively; and their dissimilar groupings in
ıt patients. But however multiplex and inconstant are
nptoms of malarial fever, the following conditions are
ıgly present, varying only in degree.

sense of weariness and inaptitutde for exertion, both
and physical hyperesthesia.

ıe fever fluctuates diurnally.

ıere is venosity of the blood and excess of the blood-
les, with relative deficiency of fibrin.

ıring the febrile exacerbation there coexist a rapid pulse,
ted circulation, local congestions, turgid veins—especially
portal system.

ic acid and its salts are found in the urine in abnormally
ed proportion, the urea being relatively diminished.

ıe urine is scanty. The respiratory mucous membranes
ıormally dry during the chill and febrile stage; and ac-
ly as moisture returns to them, and respiratory evapora-
comes re-established, the temperature of the body declines
ıout the scale from highest fever heat to normal. During
ll and early fever the skin is dry also, but at length a
ıundant perspiration breaks forth, which evaporates from
ire surface of the body, and assists to restore the normal
ıture; and, *ceteris paribus*, according to the continuance
ɔerspiration, will the apyrexial stage be partial or com-

The number of cases of malarial fevers decreases during cold weather; it does not increase *pari passu* with the accessions of summer heat. Dryness of the atmosphere favors recoveries and lessens the number of seizures, both during warm weather and cold alike. Therefore neither cold, nor heat, nor dryness, but dampness of the atmosphere, appears to be the climatic condition essentially conducive to the development of our endemic fevers.

Putrefaction, fermentation and the eremacausis of ligneous matters do not, separately or conjointly, cause malarial diseases. I recognize the fact that a growing vegetation, from every leaf, sends forth its daily modicum of aqueous vapor into the surrounding atmosphere, and thus contributes its share in maintaining a damp climate. But the plant-growth of Hudson county is mostly all husbanded, or washed away, or destroyed by fire; and there are not many places in this latitude, throughout the habitable world, where, acre for acre, so little humus is added to the soil annually. Moreover, the products of ligneous decay are water, carbonic acid, carburetted hydrogen and the residuary humus; all innocuous, and pre-eminently so as regards the etiology of malarial diseases. Fermentation yields to the atmosphere only carbonic acid gas, and a slight loss of vapor of the commercial product obtained. Concerning putrefaction it need only be remarked in this place, that it is a matter of fact of daily observation, that malarial fevers occur altogether independently of either putrefaction, fermentation or eremacausis, and that they exhibit none of the pathological phenomena to which either of these chemical processes may give rise.

Suppurative fever imitates malarial, inasmuch as it presents a distinct chill, a fever, and a sweating stage, but here the resemblance ends; its prevalence is not governed by the changing seasons; its symptoms have not their diurnal recurrences; the blood and urine have a different composition; its therapeutic indications, means and results, are not the same; and the formation of pus is its etiological *sine qua non*.

Our climate is eminently moist. The broad gulf stream, warm, and teeming with vapor, stretches eastward more than a thousand miles, and nearly that distance southward. The west and southwest winds come to us over the expanse of a continent checkered with water surface and a humid soil. Bergen Hill, the principal

habitable part of Hudson county, a ridge of very unsymmetric shape and variable width, averaging perhaps three-fourths of a mile wide and fourteen miles in length, trends a little west of south, sloping from the "Palisades" where it is 250 or 300 feet high, down to the ocean level at Bergen Point. It is trap, rock broken and precipitous along its eastern face, generally covered on its top with hard-pan overlaid with a thin soil; its western declivity gradual, and composed of water-worn pebbles, gravel, and sand, here and there piled in irregular mounds, and terraces, and undulations, the whole landscape sloping down to the Hackensack marshes. These prairie-like marshes cover an area of more than one hundred square miles. Besides, the eastern border of our county also is skirted with marshes and lowlands. Over these paludal regions, east and west, fogs brood at night, and sometimes they rise above the highest summit of the hill. The annual rainfall is about fifty inches deep; but even this is no criterion of the atmospheric moisture. Observations made with the hygrometer and thermometer repeated morning, noon and night through several years, show that our atmosphere is surcharged with moisture during all the warmer months, a few brief intervals excepted; that saturation at sundown is the general rule; and that in the hottest middays of midsummer, the wet bulb commonly stands only 5° to 7° Fahrenheit below the dry.

Now let us inquire what are the known and necessary consequences to the performance of the vital functions of man, of his breathing constantly an atmosphere nearly saturated with aqueous vapor.

1. The inspired vapor is warmed and expanded in the lungs, and it excludes just so much air as would fill the space it occupies. It dilutes the air and thereby renders the respired oxygen a less energetic supporter of combustion. Wherefore, less oxygen is admitted to the lungs; its affinity for the oxidizable constituents of the blood is weakened, and the vital fires burn low.

2. The inspiratory effort not only draws air from without into the alveoli of the lungs, but thither also, simultaneously, by the same vacuum force, carbonic acid from the blood traversing the alveolar network of capillaries. To this force, at the temperature of venous blood, the bicarbonate of soda it contains gives up one proportion of carbonic acid. But the watery vapor inhaled,

warmed and removed from atmospheric pressure in the lungs, expands perchance even more rapidly than the air it sophisticates, whereby it more or less counterbalances the vacuum force, and to this extent, defeats the physiological disengagement of the carbonic acid from its alkaline base.

3. Whatever the hygrometric condition of the *inspired* air, the *expired* air as it issues from the air passages of man in health, is always saturated with aqueous vapor. By this method from one to three drops of water are expelled from the body with every expiration, amounting to a total of from three and one-half to ten pints in twenty-four hours. But in an atmosphere saturated with vapor at a temperature of 96° Fahrenheit, respiratory evaporation ceases absolutely, and life cannot long be maintained; and exactly in proportion as the air contains moisture, this principal outlet of water from the body is shut off. It is because the capacity of the air for moisture is diminished by that which it already contains, that pulmonary and cutaneous evaporation fail in a damp atmosphere. At first the secretion of urine augments a little; and then it, too, falls below the normal amount. Water accumulates in the blood, and the vascular system is soon replete to a degree of tension, that perverts and obstructs every physiological function. Relief comes at length—often a partial relief only—but not until the vital force is well-nigh exhausted, do the emunctories of the skin give way and the pent-up torrents find vent.

4. Evaporation is a cooling process. As a vital function it takes place chiefly in the respiratory apparatus. In a state of perfect health the cutaneous transpiration is insignificant in quantity—the older physiologists to the contrary notwithstanding. Forsooth the most important function of the skin depends on its dryness and impermeability to moisture. I once had a patient sick with scarlet fever from whose body desquamation removed the entire cuticle; and the consequence was an exudation of a serous liquid containing albumen, amounting to from two to four pints per day, and jeopardizing life. Renewal of the cuticle betimes put a stop to the morbid drainage. Respiratory evaporation physiologically outmeasures the cutaneous at all times. Nevertheless, cutaneous evaporation is considerable in a dry atmosphere when the surface of the body is wet with perspiration. But whenever and to whatever extent beyond the physi-

ological limit, the dampness of the air arrests evaporation, the heat of the body accumulates abnormally. In fact pulmonary oxygenation falls off at the same time, but it does not stay the pyrexia. Fever, of every type, is attended with dryness of the skin and respiratory mucous membranes and with obstructed and feeble circulation: and herein, in the consequent arrest of evaporation, lies the true explanation of the origin of fever heat.

5. Either hyperpyrexia, or congelation, can destroy life. In both these antipodal temperatures of the body alike, man dies by total anesthesia of sense and motion. A deficient respiratory evaporation—deficient, that is to say, below the range of physiological variations—causes not only pyrexial rise of the temperature of the body, but hyperemia and hyperesthesia at the same time as well. Hyperesthesia is a morbidly exalted sense of fatigue, pain—intolerance of light, sound, smell, taste, contact,—weakness and inability to put forth and control muscular effort. It accompanies hyperpyrexia and ends in death by exhaustion of nerve power and complete paralysis. External cold causes anesthesia in a direct manner; not, however, unattended temporarily by local pains in parts rendered relatively hyperesthetic. The conclusion seems incontrovertible that normal innervation, no less than normal temperature, is maintained and governed by the physiological balance of the calorific and the cooling processes. When an atmosphere burdened with moisture disturbs the equipoise of the vital functions, then hyperesthesia arises as surely as do hyperemia and pyrexia. In point of fact hyperemia alone, regardless of coexisting fever, implies hyperesthesia; examples of which can profitably be studied in our climatic neuralgias.

6. A damp atmosphere, in proportion to the vapor it contains, increases the uric acid and diminishes the urea in human urine. In certain extreme pathological phases, human urine also exhibits a trace of uric oxide. These excreta are the nitroganized residua of the disintegration of connective tissue. The capillary blood vessels are neither more nor less than unlined tunnels through the connective tissue, whose walls are continually flamed and worn away by the chemical action upon them of the oxygen brought hither by the blood-corpuscles. Urea is the almost exclusive excretion of animals having biconcave red corpuscles, as the mammalia (the urine of carnivorous

mammals yields only faint traces of uric acid); uric acid, of animals having biconvex red corpuscles, as the oviparous vertebrata; and uric oxide has been found to be the normal urinary constituent of some of the lower invertebrate animals, the araneidans for example. The biconcave corpuscles contain more iron and carry more oxygen; the biconvex contain less iron and carry less oxygen; and the blood-analogue of the araneidans contains too little iron to form blood-corpuscles, and carries of oxygen least of all.

The formula for urea is $C^2H^4N^2O^2$.

The formula for uric acid is $C^5H^4N^4O^3$.

The formula for uric oxide is $C^5H^2N^4O^2$.

To complete the combustion of urea requires the addition to it of six equivalents of oxygen only, while uric acid takes nine, and uric oxide ten. Urea in human urine is the product of a perfect physiological oxidation of the nitrogenized connective tissue disintegrated; uric acid is the product of imperfect oxidation, and uric oxide of an oxidation more imperfect still. When, therefore, the moisture of the air respired is observed to increase the uric acid in human urine, and, pre-eminently, if it add thereto a trace of uric oxide also, a retardation of tissue-metamorphosis is indicated thereby, which is unmistakably pathological.

7. The most variable constituent of the air is moisture. The quantity of moisture which a given volume of air will hold, increases with the temperature, but in a much faster ratio than the temperature. It follows from this law, that, in a damp climate like our own, the diurnal changes of temperature dependent on the presence of the sun's rays by day and their absence by night, are vastly exceeded by the diurnal fluctuations in the amount of moisture diffused through the air. All the vital functions of man must needs feel and respond to these regular atmospheric alternations, potent as they are, and of life-long continuance. And, verily, man has his diurnal mutations of temperature, of energy, of vascular fulness, of gland-secretion, &c., which he tolerates well within the accustomed physiological range; but which are liable by stress of weather to extend beyond the limits of tolerance and health into the domain of pathology. Malarial fevers are but picture-expressions of the abnormal exaggeration of these diurnal ebbs and floods that run through all vital phe-

nomena, whensoever, and inasmuch as, they exhibit diurnal exacerbations and remissions, intermissions and recurrences.

If, therefore, all the pathological conditions of malarial fevers are demonstrably identical, each with each, with the functional disturbances which of necessity result to man from dwelling in, and breathing an atmosphere highly charged with aqueous vapor; if the records of cases and the readings of the hygrometer, combine to show that when and where continued excess of atmospheric moisture coexists with great diurnal variations, then and there malarial diseases prevail most numerously; or, if we regard the fact that the alternating atmospheric influences of day and night, and of the changing seasons, stamp their impress on malarial diseases in unmistakable minuteness of detail; the conclusion seems to be unavoidable that the true *malaria*, the etiological factor in the origin of our climatic fevers, is *atmospheric moisture.*

The philosopher who revels in visions of final causes, and has an intangible myth for every unexplained phenomenon, attributes to "poisons," "spores" or "disease-germs," all pathological appearances, the source of which he fails to comprehend. It has, of late years, grown to be fashionable in scientific circles, the world over, to peer through a microscope deep into the innermost intentions and capabilities of these pristine parents of disease. How often have M. Pasteur and his disciples, by this means, caught sight of some abhorrent infinitessimal in the very act of manufacturing a pestilence! This most excellent method of discovery commends itself to plausible students of a metaphysical turn of mind, too indolent for genuine scientific investigation. Should any such professional *savant* take exception to the views here enunciated, he has only to exhibit a "self-propagating disease-germ" gravid with embryo intermittents, and to point out to me that other class of diseases, not malarial, to which the morbific influences of a moist atmosphere are accustomed to give rise, and I shall most cheerfully relegate the malarial fevers of our country back to the misdeeds of "algoid cryptogams" and "the scientific uses of the imagination."

Notes on Localities Injurious to Health by Reason of Imperfect Drainage.

BY GEORGE H. COOK, STATE GEOLOGIST OF N. J.

The prevalence of intermittents and other diseases which are limited to particular districts, is an indication of an unwholesome state of the earth, or of the atmosphere over it. As a general rule, such diseases are peculiar to localities which are badly drained. There are many such spots in our State, and every year the sickness and suffering from insufficient drainage are such as to excite the sympathy of every lover of his race. And the losses from suspensions and derangements of business make up a large amount of value, taken from the wealth of the country, by this very unnecessary cause of disease. Pond holes, half drained swamps, flat grounds subject to overflow in freshets, and illy-drained pastures and meadows, are the localities which are particularly exposed to the visitation of these periodic diseases. Such localities are more common in the northern than in the southern part of the State.

A few facts in regard to the unwholesome effects of such grounds will best illustrate this subject.

"The Drowned Lands" occupy the valley of the Wallkill from Hampton, three miles west of Goshen, in Orange county, to near Hamburgh, in Sussex county, a distance of 37 miles by the course of the stream, and of 20 miles in a straight line. They cover 25,600 acres, of which 15,600 are in Orange county, and 10,000 in Sussex. As early as 1742, Dr. Cadwallader Colden, Surveyor General of the Province of New York, wrote of the insalubrity of these lands. "The inhabitants along the Wallkill are yearly afflicted with intermittent fevers during the summer season, and a constant fog or vapor is observed almost all the summer (except in the time when the northerly or northwest winds blow), to arise over the river, and to remain there at a certain height

and distance every morning." In the Medical Repository for 1809, Dr. D. R. Arnell stated in a Report to the State Medical Society of New York, "that an act was passed before the Revolutionary war to enable the proprietors of those lands to drain them. An attempt was then made, and about two thousand pounds expended at the outlet of the Wallkill; but the Revolution coming on, put a stop to labors." He also said that, "along the Wallkill and Otterkill or Murderer's creek, the tertian intermittent and remittent fevers prevail to a great degree in the fall of the year; but on the west side of the drowned lands they put on a more dangerous and formidable appearance than they do in other parts of the county." In the American Medical and Philosophical Register for 1810, is "an account of the fever which lately prevailed at the drowned lands in Orange county, by Dr. D. R. Arnell."

Omitting much of detail, he says "the lands are generally overflowed with water the greater part of the season;" also "the water was confined back on the drowned lands during the day, but at night the gates were opened and it was suffered to pass off." "The proprietors have been incorporated into a company for draining them, and have employed a large number of workmen for that purpose the last three summers. The country around them is hilly, rough and uneven, and has been visited with remittent and intermittent fevers during the autumn for a number of years past; but the fever has never put on so malignant and dangerous an appearance as it has the two last seasons, at the outlet of the drowned lands, among the workmen and hands employed in draining them."

In an article on the Drowned Lands of Orange county, N. Y., and Sussex county, N. J., published by the American Public Health Association, in their second volume of Reports, is a note from Hon. Wm. Owen, who resides near Pine Island, in those lands. He says, "chills and fever are common in autumn, everywhere along the borders of the drowned lands and on the islands. Before the outlet was cut there were seasons in which the majority of the residents were sick with intermittents. Since that time such diseases have been less common, though they still prevail to an unpleasant degree. The hill country, which borders this part of the valley, is entirely exempt from chills and fever. It is thought, too, by some careful observers, that pulmo-

nary disease is more common along the eastern border of this tract than it is along its western side, owing to the prevailing westerly wind, which carries the damp, chilly air from these wet and really drowned lands."

In the same article there is also a note from Samuel E. Gale, Esq., of Pine Island, upon the same subject. He says, "About forty-five years ago we derived considerable benefit from an improved drainage, the effect of cutting a canal lower than the old bed of the Wallkill at Hampton, and a small portion of these lands was redeemed and made tillable, demonstrating the fact that a system of perfect drainage is all that is required to make this the strongest soil, and also the most productive of any in either of the States in which it is located. Previous to the cutting of this channel these lands were entirely under water for from three to four months each year, and were productive of nothing but wild grass and weeds, of no value and unfit for use. Not only would perfect drainage be a benefit to the soil, but I think it would have a good effect upon the health of the residents upon and around the lands. For the past forty-five years chills and fever have prevailed in the summer, making it almost impossible for strangers to escape the dreaded disease. I notice the percentage is far greater here on the islands than on the hilly districts of Orange and Sussex. Although the freshets are not so great or of as long continuance as before the cutting of the canal, yet every spring and fall these lands are overflowed, and our crossroads almost impassable by reason of being for a week or ten days from six to thirty-six inches under water. Last season, while the dry weather ruined all the hay crops on uplands, our redeemed drowned lands were covered with a heavy burden of good grass. A freshet came before the people had time to secure the grass, rendering it impossible to get on the lands, and thus nine-tenths of the crop was destroyed. These are facts in regard to the drowned lands which any resident near them will corroborate."

In the same article is still another from Dr. Wm. B. Bradner, who is practising near the drowned lands, and describes the effects of the stagnant waters of one of the branches of the Wallkill, which joins it there. He says "our creek flows through and should drain 3,000 acres of heavy boggy land, but probably half of the year, 2,000 acres are overflowed and covered with stagnant

water, and then slowly drying into pools and water soaked soil, and in very dry seasons becoming passably free from water. Now last spring the rains were sufficient to cover these lands, and it was summer before they were dried out; but the summer was very dry at first, until nearly all the marsh land was drained and dried up, then came the heavy rains, and everything was again afloat there, then another dry time followed. The result is this, miasmatic diseases have reached a pitch unknown here, and who can doubt the cause? When I say 40 years, I refer to a historic period, for about that time the physicians residing here compelled the citizens to destroy a mill-dam below the village, and thereby secured a passable drainage of the meadow lands south of us. They did so in hopes of removing the cause of a most terrible fever then prevailing here, and when the mill-dam was gone and the meadow drained, there was an end of the fever. The same creek is now checked with debris and sand bars, so that we are suffering the same way our fathers did nearly a half century ago. I have attended very many cases this year, nearly all of them occurring in the valley. True, some were sick on the mountains, but it is a noteworthy fact that the only case I have seen sick with any form of miasmatic disease on the mountains this year, was a man who had worked daily in the valley, and doubtless contracted the disease there, and not on the hill tops."

The annual report on the progress of the Geological Survey for this year, has an account of the drainage of the Great Meadows on the Pequest in Warren county, in which there is testimony to the former insalubrity of that region. Drs. Blackwell and Cooke of Hackettstown, Dr. Roe of Vienna, and Dr. Hartpence of Oxford, all of whom have practiced along the borders of the meadows, say that autumnal fevers and malarial disorders prevailed there much more than in the hilly country around, and they attribute these to the stagnant water and undrained ground of the meadows. Dr. Blackwell says "it appeared to me while sojourning in this neighborhood and marking the effect of these blighting influencs upon the health of the people, that I could preceive in the lessened vigor and robustness of many of the residents, the results of this insidious and baleful poison. According to my observation, this is by far the worst malarious district in this part of the State. The outbreak of malaria always occurs when the overflow of the Pequest drying up, leaves its sedimentary matter,

as well as the earth soaked with deadly gases, to the full influence of the fierce autumn sun."

The Passaic river has numerous large bodies of undrained land along its borders, in Morris, Union and Essex counties. Between 20,000 and 25,000 acres of land are there, liable to freshets and overflow, and to bring upon the people living on or near them an annual attack of chills and fever. Such diseases are very prevalent in seasons when the freshets occur, after the grass is grown, so as to hold back the water that overflows the meadows, and let it become stagnant. A single extract from a letter of Dr. E. R. Laine, of Caldwell, Essex county, is sufficient to illustrate this, though it is not a thousandth part of the ill effects that have been experienced from this lack of proper drainage. Writing in the winter of 1875 he says: "On the 10th of August, 1875, there occurred a heavy rain storm, which completely submerged the lowlands bordering the Passaic above Little Falls. This storm was followed by a warm, dry spell of weather, which caused the tall vegetation to rapidly ferment and decay to such an extent as to give the water of the river the appearance of strong tea, so saturated was it with vegetable juices. Upon the subsidence of the water from the inundated meadows and exposure to the hot sun, they emitted an extremely unpleasant odor that was perceptible a mile off in some directions.

"The above condition of things led me to think it a most favorable one for the development of malarial troubles, and to anticipate an early epidemic of intermittents. I was not mistaken in my surmises, for in three weeks from the time of the storm it made its appearance. I soon had my hands full, though there were a great many cases that did not come under my notice—the patients treating themselves with quinine and other well-known remedies. A curious circumstance connected with the cases under my treatment was the fact that some four or five patients had the paroxysm commence on the same day and same hour of the day, and continue in the same manner for some time.

"Most of the cases occurred in the neighborhood of what are known as the Great and Little Pieces on Horse Neck, where there were fifteen. There were six cases at Pine Brook, and on the higher grounds there were only four which came under my treatment."

One of the gentlemen having charge of the draft that was made

in Morris county for soldiers in the late war, informs us that the number of persons exempted on account of lack of physical health and vigor, was by far greater in the townships in which these undrained lands lie, than in any other. And it was understood by those concerned in the examination, that failure of health and vitality was owing to the insalubrious atmosphere to which they were so unfortunate as to be exposed.

There are many other tracts of ground of smaller extent within the State, from which other testimony of the same kind could be obtained. But the above is sufficient. The evil is one of great public importance in the present condition of our State. Located near the great centres of business on this continent, and having a delightful climate, it attracts new residents to all its pleasant and salubrious districts, and is destined soon to be the most densely populated of any of the United States. The removal of these few causes of disease will help to make it most uniformly healthy.

Heretofore, drainage in the country has been done only for its agricultural benefits, and the lands drained have been assessed to pay the expenses. The damage to individual health, and the loss of life to families have been borne without aid or relief from the public authorities. Mill-dams, and obstructions hindering the free flow of streams, have been considered of too much value to be removed on any ground of public good or sanitary benefit. The time has come when public authorities must interpose to protect suffering communities, and by a judicious and equitable use of their credit, authorize and encourage well-planned works of drainage.

METEOROLOGICAL TABLES.

NEWARK, N. J. 1873—1877.

No. 1.—Showing the Minimum, Maximum and Mean Temperature, and the quantity of Water from Rain and Melted Snow for each Month.

MONTHS.	Years.	MIN'M TEMP'E. Date.	MIN'M TEMP'E. Degree.	MAX'M TEMP'E. Date.	MAX'M TEMP'E. Degree.	Mean of Month.	Inches of Rain and Melted Snow.	Mean Temperature, 5 years.	Mean Water Fall, 5 years.
January	1873	30	—12	16	42¼	24.77	5.820	28.20	3.812
	4	16	9	23	61¼	32.61	5.670		
	5	19	—3	22	37	22.92	3.310		
	6	14	12½	2	65	34.90	1.200		
	7	6	7½	27	42½	25.80	3.060		
February	1873	24	—1½	8	47¾	27.41	3.885	29.12	3.292
	4	2	3½	23	68¼	28.66	3.168		
	5	10	1½	24	48¾	22.92	2.400		
	6	5	6½	13	55¼	32.13	5.355		
	7	14	11	21	49	34.46	1.650		
March	1873	5	8½	23	52	34.47	2.760	35.57	4.958
	4	13	15½	4	63¼	37.83	2.135		
	5	1	10¾	30	56	31.84	3.820		
	6	19	10¾	7	66¼	36.13	10.000		
	7	19	13	23	59½	37.56	6.075		
April	1873	1	33¼	28	64½	46.58	5.835	45.87	4.823
	4	5	20¾	15	66¼	41.48	8.715		
	5	19	22	2	68	43.42	3.135		
	6	9	29	14	69½	48.46	3.305		
	7	3	30¾	24	78½	49.40	3.125		
May	1873	4	36¾	28	83	57.97	3.755	59.35	2.432
	4	3	33¾	10	88¼	58.62	2.755		
	5	3	36¼	21	85¼	60 13	1.595		
	6	1	35¾	7	85¼	59.46	3.045		
	7	3	37¼	18	87	60.56	1.010		
June	1873	3	47¾	19	88¾	68.59	1.715	70.10	2.677
	4	2	50½	29	91	69.41	3.580		
	5	14	47	25	92	68.75	2.335		
	6	1	47¾	26	90	72.18	1.585		
	7	23	53¾	26	93½	71.58	4.170		

No. 1 (Continued).—Showing the Minimum, Maximum and Mean Temperature, and the quantity of Water from Rain and Melted Snow for each Month.

MONTHS.	Years.	MIN'M TEMP'E. Date.	MIN'M TEMP'E. Degree.	MAX'M TEMP'E. Date.	MAX'M TEMP'E. Degree.	Mean of Month.	Inches of Rain and Melted Snow.	Mean Temperature, 5 years.	Mean Water Fall, 5 years.
July	1873	12	58	3	91½	74.13	6.615	75.33	5.172
	4	5	59½	15	88½	73.48	4.230		
	5	24	58	6	91	72.88	5.985		
	6	27	58	9	98	78.31	3.060		
	7	14	60½	26	99	77.86	5.980		
August	1873	24	56½	3	88½	74.40	7.765	73.05	6.189
	4	27	53½	20	89	69.21	2.785		
	5	3	56½	31	83¾	70.94	10.215		
	6	22	53½	7	92½	74.15	2.450		
	7	6	60	8	94¾	76.57	7.730		
September	1873	15	42¾	1	84½	63.89	3.550	64.55	4.701
	4	22	48	11	88½	66.79	9.050		
	5	23	41	3	85½	62.50	1.930		
	6	28	45¾	1	88	62.81	7.505		
	7	23	47½	14	85	66.74	1.470		
October	1873	30	30	5	71¾	53.37	3.740	52.63	3.608
	4	15	33½	29	70½	53.69	2.435		
	5	14	33½	25	69½	51.83	2.870		
	6	30	30¾	6	71¼	48.67	1.260		
	7	23	35¾	16	75½	55.57	7.735		
November	1873	21	20½	3	57½	36.12	4.670	40.72	4.569
	4	14	20¾	6	64½	40.98	2.860		
	5	30	8	13	61¾	37.98	4.360		
	6	29	27½	2	70	43.92	4.040		
	7	21	25¾	9	65½	44.82	6.915		
December	1873	31	16¾	4	64¾	34.38	2.476	31.87	2.266
	4	15	7¾	3	50½	31.19	2.810		
	5	20	2½	23	58½	32.30	2.610		
	6	10	4	13	44	23.81	2.515		
	7	2	22¾	20	58½	37.65	0.920		

2.—Showing the Minimum, Maximum and Mean Temperature, and the quantity of Water from Rain and Melted Snow in each year, with the number of days on which it was fair or on which rain or snow fell.

RS.	MINIMUM.		MAXIMUM.		Mean Temp.	Inches of Rain and Melted Snow.	Fair on Days.	Rain on Days.	Snow on Days.
	Date.	Degree.	Date.	Degree.					
73	Jan. 12	—12	July 3	91½	49.34	52.580	232	97	35
74	Feb. 2	3½	June 29	91	50.41	50.193	239	92	28
75	Jan. 19	—3	June 25	92	48.20	44.565	219	102	44
76	Dec. 10	4	July 9	98	51.23	45.320	216	96	31
77	Jan. 6	7½	July 26	99	53.21	49.840	228	98	13
Average of the five years.....					50.48	48.500	227	97	30

3.—Showing the Minimum, Maximum and Mean Temperature and the quantity of Water deposited in each Season.

ASONS.	Years.	MINIMUM.		MAXIMUM.		Mean Temp.	Inches of Rain and Melt'd Snow.	Mean Temp., 5 years.	Mean Water Fall, 5 years.
		Date.	Degree.	Date.	Degree.				
g	1873	Mar. 5	8½	May 28	83	46.27	12.350	46.91	12.213
	4	" 13	15½	" 10	88½	45.97	13.605		
	5	" 1	10¾	" 21	85½	45.13	8.550		
	6	" 19	10¾	" 7	85½	48.05	16.350		
	7	" 19	13	" 18	87	49.14	10.210		
ıer	1873	June 3	47¾	July 3	91½	71.04	16.095	72.56	12.042
	4	" 2	50½	June 29	91	70.70	10.595		
	5	" 14	47	" 25	92	70.86	18.545		
	6	" 1	47¾	July 9	98	74.88	7.095		
	7	" 23	53¾	" 26	99	75.34	17.880		
an	1873	Nov. 21	20½	Sept. 5	84½	51.12	11.960	52.63	12.878
	4	" 14	20¼	" 11	88½	53.82	14.345		
	5	" 30	8	" 3	85½	50.77	9.160		
	6	" 29	27½	" 1	88	51.73	12.805		
	7	" 30	27	" 14	85	55.71	16.120		
r	1872-3	Jan. 30	—12	Feb. 8	47¾	25.59	13.490	28.92	9.942
	3-4	Feb. 2	3¼	" 23	68½	32.21	11.308		
	4-5	Jan. 19	—3	Dec. 3	50½	25.67	8.520		
	5-6	Dec. 20	2½	Jan. 2	65	33.11	9 165		
	6-7	" 10	4	Feb. 21	49	28.03	7.225		

NO. 4.—SHOWING THE AMOUNT OF SNOW FOR THE LAST F YEARS—STATION, NEWARK.

INCHES OF SNOW EACH WINTER.

MONTHS.	1872-3	1873-4	1874-5	1875-6	187
October	.....	.....	.....	1	....
November	3½	.....	.....	0½	....
December	25	8	21	1¼	
January	14	6	17	¾	
February	23½	22	5	10	
March	2	5	17¼	6½	
April	3	5	7½	.....	....
Total each winter	71	46	68	20	

NO. 5.—APPROXIMATE WINDS—NEWARK 1877.

From observations of the general course of the wind each morning a afternoon. The figures being the result of the addition of l days:

MONTHS.	N.	N. to N. E.	N. E.	N. E. to E.	E.	E. to S. E.	S. E.	S. E. to S.	S.	S. to S. W.	S. W.	S. W to W.	W	W. to N. W.	N. W.	N
January	1	2	3	...	...	...	2	...	1	...	8	2	4	2	5	
February	1	3	2	...	...	...	1	...	...	...	3	4	...	3	7	
March	1	3	7	1	...	1	2	...	...	...	4	1	2	1	7	
April	...	2	8	3	3	2	3	...	...	...	2	...	...	1	4	
May	2	1	2	1	1	...	4	...	...	2	5	1	2	1	8	
June	...	...	2	1	2	1	7	2	1	...	8	3	1	...	2	..
July	...	2	5	...	...	2	6	1	...	...	4	2	2	1	5	
August	...	2	3	1	1	1	3	1	1	...	4	1	6	...	6	
September	...	1	3	...	1	...	5	2	...	1	9	...	2	1	5	..
October	1	...	5	...	1	...	4	...	...	...	5	1	6	...	7	
November	1	1	5	1	1	...	2	...	1	...	5	1	4	1	6	
December	1	...	8	1	...	...	...	...	1	...	5	3	5	3	3	

METEOROLOGICAL SUMMARY FOR 1877 OF OBSERVATIONS BY E. COOK.—STATION, TRENTON.

Thermometer highest—August 29.....
Thermometer lowest—January 3.....

Rained on 69 days; *Snowed 3 times; 17 thunder showers; 15 fogs; †27 frosts hail storms.

First frost, September 22; first ice, November 7; first snow, November 21.

Amount of rain fallen in each month:

	INCHES.
January	2.10
February	1.31
March	5.65
April	2.70
May	0.91
June	4.45
July	7.40
August	5.47
September	3.45
October	6.50
November	8.41
December	2.90
	51.25

*Snows since November 21.
†Frosts since September 22.

METEOROLOGICAL RECORDS FURNISHED BY EZRA A. OSBORNE, C. E.

BAROMETER.

Monthly and Annual mean pressure—July, 1875, to June, 1876, inclusive.

STATIONS.	1875.						1876.						Annual Means.
	July.	August.	September	October.	November.	December.	January.	February.	March.	April.	May.	June.	
Atlantic City	29.996	30.036	30.040	30.001	30.087	30.020	30.149	30.115	30.028	29.995	30.061	30.010	30.045
Barnegat	29.987	30.030	30.026	29.993	30.067	30.003	30.136	30.108	30.019	29.986	30.055	30.004	30.034
Cape May	29.999	30.028	30.043	30.000	30.092	30.032	30.165	30.127	30.039	30.009	30.084	30.018	30.052
Long Branch	29.987	30.043	30.032	29.994	30.076	30.024	30.132	30.112	30.018	29.982	30.048	29.998	30.037
Sandy Hook	29.971	30.024	30.011	29.977	30.070	30.006	30.112	30.092	29.999	29.963	30.026	29.981	30.019

THERMOMETER.

Monthly and Annual mean temperature—July, 1875, to June, 1876, inclusive.

STATIONS.	1875.						1876.						Annual Means.
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	
	°	°	°	°	°	°	°	°	°	°	°	°	°
Atlantic City	73.0	72.0	64.1	54.5	40.7	35.8	37.2	34.6	36.5	46.1	55.5	68.2	51.5
Barnegat	72.5	71.6	64.5	53.9	40.4	36.4	36.7	33.9	36.3	46.0	56.0	67.3	52.1
Cape May	72.8	71.6	64.7	55.4	43.2	38.5	39.7	37.5	38.3	47.7	57.3	70.5	53.1
Long Branch	72.8	71.2	64.1	54.1	41.3	36.6	38.3	34.9	37.7	45.5	56.5	68.4	51.8
Sandy Hook	73.0	71.7	64.0	53.4	40.9	34.3	36.4	33.3	36.7	46.8	58.7	71.7	52.6

RAIN FALL.

Monthly and Annual amounts of rain fall, in inches, from July, 187 to June, 1876, inclusive.

STATIONS.	1875.						1876.						
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	Annual
Atlantic City	1.30	4.78	2.45	2.17	4.19	4.28	1.06	3.53	4.78	1.88	3.92	1.78	3
Barnegat	5.97	4.18	3.99	1.67	5.40	4.63	1.55	4.04	9.18	3.08	3.79	2.42	4
Cape May	3.13	10.16	2.70	2.03	4.75	3.39	1.14	2.78	7.31	3.10	3.25	5.67	4
Long Branch	7.19	11.93	4.05	3.40	7.27	4.32	1.62	5.69	10.57	3.51	4.73	4.54	6
Sandy Hook	4.44	8 96	2.98	3.50	5.36	3.40	1.35	5.80	11.04	3.92	4.47	5.96	6

SIGNAL STATIONS IN NEW JERSEY.

ATLANTIC CITY.

Latitude..... 39° 22′
Longitude..... 74° 25′
Mean barometer for the year ending June 30, 1876..... 30.045
Mean temperature for the year ending June 30, 1876..... 51°.5
Amount of rain fall for the year ending June 30, 1876..... 36.09 inch

BARNEGAT.

Latitude..... 39° 48′
Longitude..... 74° 9′
Mean barometer for the year ending June 30, 1876..... 30.034
Mean temperature for the year ending June 30, 1876..... 52°.1
Amount of rain fall for the year ending June 30, 1876..... 49.88 inch

CAPE MAY.

Latitude..... 38° 56′
Longitude..... 74° 58′
Mean barometer for the year ending June 30, 1876..... 30.052
Mean temperature for the year ending June 30, 1876..... 53°.1
Amount of rain fall for the year ending June 30, 1876..... 49.41 inch

LONG BRANCH.

Latitude..... 40° 18′
Longitude..... 73° 59′
Mean barometer for the year ending June 30, 1876..... 30.037
Mean temperature for the year ending June 30, 1876..... 51°.8
Amount of rain fall for the year ending June 30, 1876..... 68.82 inch

SANDY HOOK.

Latitude..... 40° 28′
Longitude..... 74° 1′
Mean barometer for the year ending June 30, 1876..... 30.019
Mean temperature for the year ending June 30, 1876..... 52°.6
Amount of rain fall for the year ending June 30, 1876..... 61.18 inch

REFERENCE TO FORMER STATE LAWS BEARING ON PUBLIC HEALTH.

1798? VITAL STATISTICS.

1. An act relating to the registry and returns of births, marriages and deaths in the State of New Jersey. Pamphlet Laws of 1848, page 155.

2. A supplement to an act entitled "An act relating to the registry and returns of births, marriages and deaths in the State of New Jersey," approved March third, eighteen hundred and forty-eight. Pamphlet Laws of 1851, page 434.

3. A supplement to an act entitled "An act relating to the registry and returns of births, marriages and deaths in the State of New Jersey," approved March third, eighteen hundred and forty-eight. Pamphlet Laws of 1862, page 161.

4. A further supplement to an act entitled "An act relating to the registry and returns of births, marriages and deaths in the State of New Jersey," approved March third, eighteen hundred and forty-eight. Pamphlet Laws of 1863, page 405.

5. A further supplement to the act entitled "An act relating to the registry and returns of births, deaths and marriages in the State of New Jersey," approved March thirtieth, one thousand eight hundred and forty-six. Pamphlet Laws of 1863, page 472.

(A mistake has been made in the title of this supplement in referring to the act of "one thousand eight hundred and forty-six," for I find no such act.)

6. An act to provide for a board of health and vital statistics in the county of Hudson, and to prevent the spread of diseases. Pamphlet Laws of 1874, page 569.

7. A supplement to the act entitled "An act concerning marriages, births and deaths," approved March twenty-seventh, eighteen hundred and seventy-four. Pamphlet Laws of 1876, page 158.

(The title is wrongly quoted.)

8. A supplement to an act entitled "An act concerning marriages, births and deaths," approved March twenty-seventh, eighteen hundred and seventy-four. Pamphlet Laws of 1877, page 168.

9. An act to amend an act entitled "A supplement to an act entitled 'An act concerning marriages, births and deaths,'" approved March twenty.seventh, eighteen hundred and seventy-four, which supplement was approved April seventeenth, eighteen hundred and seventy-six. Pamphlet Laws of 1877, page 214.

10. Special law for the city of Newark entitled, "An act for the registration of births, marriages and deaths in the city of Newark." Pamphlet Laws of 1871, page 805.

MEDICINE AND SURGERY.

11. An act to reorganize the Medical Society of New Jersey (former act and all supplements repealed.) Pamphlet Laws of 1864, page 250, and Revised Statutes of 1877, page 675.

QUARANTINE.

An act to relieve owners and officers of vessels owned in New Jersey from detention at quarantine. Pamphlet Laws of 1874, page 57, and Revised Statutes of 1877, page 300, relates to quarantine.

PUBLIC HEALTH.

An act concerning unwholesome food, making the selling of unwholesome food criminal. Nixon's Digest, page 206, section 77.

An act relating to public health. Pamphlet Laws of 1874, page 47.

An act to establish a State Board of Health. Pamphlet Laws of 1877, page 220.

An act relating to the appointment of a sanitary commission. Pamphlet Laws of 1866, page 982.

An act relating to the sanitary condition of the public schools. Pamphlet Laws of 1873, page 152.

INFECTIOUS DISEASES.

1. An act to prevent the introduction of malignant and other infectous diseases in this State, (former act repealed.) Pamphlet Laws of 1871, page 84, and Revised Statutes of 1877, page 300.

An act to prevent diseases among cattle. Pamphlet Laws of 1866, page 981, &c.

NOTE.—The permission of the New Jersey Agricultural Society to be obtained, for the shipment of cattle from foreign countries, by public advertisement in three newspapers.

ADULTERATIONS.

1. An act making it a criminal offence to manufacture, or sell, or import already manufactured for sale, any adulterated or spurious liquors in the State of New Jersey. Pamphlet Laws of 1871, page 105.

2. An act to prevent the adulteration of milk, and to prevent traffic in impure and unwholesome milk. Pamphlet Laws of 1875, page 58.

NUISANCE.

Nuisance at common law deemed a misdemeanor. Revised Statutes of 1877, page 261, sec. 192.

VACCINATION.

Commission to report what they may deem important respecting "the vaccination of the indigent." Pamphlet Laws 1866, p. 982.

PHARMACY.

An act to regulate pharmacy. Pamphlet Laws of 1877, page 11.

An Act to establish a State Board of Health.

1. BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey*, That the governor shall appoint seven persons, who, together with the Secretary of state and attorney general as ex-officio members, shall constitute the board of health of the State of New Jersey; the persons so appointed shall hold their officers for seven years; *provided*, that the terms of office of the seven first appointed shall be so arranged that the term of one shall expire each year, and the vacancies so created, as well as all vacancies occurring otherwise shall be filled by the governor.

2. *And be it enacted*, That the board shall take cognizance of the interests of health and life among the citizens of this State; they shall make sanitary investigations and inquiries in respect to the people, the causes of disease, and especially of epidemics and the sources of mortality, and the effects of localities, employments, conditions and circumstances on the public health; and they shall gather such information in respect to these matters as they may deem proper for diffusion among the people; they shall also make inquiries and reports in reference to diseases affecting animals, and the methods of prevention; they shall appoint a chairman, who shall call meetings as often as every three months, or when requested to do so by three members of the board; they shall, in the month of December, make report to the governor of their investigations and opinions during the year ending December first, with such suggestions as they may deem necessary; *provided*, that the provisions of this act shall not apply to any city, borough or township in which there is a local board of health.

3. *And be it enacted*, The board shall elect a secretary from their own number who shall superintend the work prescribed in the law, as the board may require; the entire expense in prosecuting inquiries and securing the desired information shall not exceed one thousand dollars; and said amount shall be payable by the comptroller on account rendered, and signed by the president and secretary of the board and approved by the governor.

4. *And be it enacted*, That this act shall take effect immediately.

Approved March 9, 1877.

INDEX.

	PAGE.
Act of Board of Health	146
Address of Chairman	9
Air condition	53, 75, 78, 82, 88
Anemometer	75
Association, Sanitary N. J.	23–32
Asylums	5
Baths	96
Blackboards	71
Births	39–41
Borax as a disinfectant	93
Boards of Health	5–8
Board, Members of	8
Barker's Ventilation	72
Carbonic Acid	77–89
Oxide	81–89
Cisterns	95
Climatology	31
Cook, Prof. G. H.	132
Contagious Diseases	11, 64, 103
Consumption	12
Cholera	6
Commission, Sanitary	6–7
Correspondence of the Board	24
Convention, Sanitary	8
Cornwall, Prof. H. B.	78–84
Culver, J. E.	121–9
Death Rate, Difference of	10, 37
Duties of the Board	14
Deaths	39–41
Diphtheria	20, 115–17
Dew-point	73
Desks	60–71
Dryness of the Atmosphere in Rooms	73
Disinfectants	63, 81, 93
Drainage	132
Dust	82
Domestic Hygiene	87
Disraeli (Lord Beaconsfield)	5
Eating	65
Endermaim on School Air	53

PAGE.

Errors in Vital Statistics 18–37
Eye Diseases 55, 70, 89
Rules as to 70
Factories 28
Facts as to Vital Statistics, how obtained 37
Fireplaces 76, 92
Foot-travel on Railroads 31
Geology 22
Gladstone 5
History of former Sanitary Legislation in New Jersey 4–8
Health, Boards of 5–8
Hygiene, Domestic 87
of Home 43
Schools 43
Hog Nuisance 25
Home, the 43
Hair Hygrometer 74
Housekeeping of School-houses 61
Hough, J. B 53
Hunt, E. M 3, 33, 43–85
Heating 72, 81, 91
Impurities of Air in Houses 53, 75, 89
Janitorship 61
Kedzie, Prof 53, 73
Laws as to Public Health 143
List of Subjects 17, 33
Lung and Skin Excretions 55, 89
Marriages 39–41
Malaria 108, 21
Measles 104
Marsh, E. J 35–42
Methods of Improving Vital Statistics 35
Moisture 73, 121
Milk Nuisance 24
Members of the Board 8
Martinus Scriblerus 60
Moisture and Miasm 121
Meteorological Tables 137
Nervous Ailments of Children 58
Objects of the Act for Board of Health 3
One-sidedness of Pupils 58
Organization, Temporary 8
Permanent 16
Pauperism and Crime 5, 44
Physiology, What its Import 69
Plenum Ventilation 76
Privy Conveniences 62, 90
Railroads 31
Rainfall 137

PAGE.
Recesses of Schools 65
Ridge, J. M. 87–102
Registry 34
Report of Corresponding Secretary 3
Roseola 106
Sanitary Commission of New Jersey, 1866 6
Health Board, 1876 7
Science, Scope of 4, 9
Convention 8
Association, New Jersey 25–32
Scope of Sanitary Science 4, 9
State Boards of Health, number, etc 5
Statistics, Vital 4, 12, 18, 35
Small-pox 21, 108
Scarlet Fever 21, 104, 111, 114
School, the 50
Sources of Contamination 75–89
Skin and Lung Excretions 55–89
Spinal Diseases in School Life 58
Seats in School 57–71
Superintendents, State and County 68
School Evils, how to overcome 70
Suction Ventilation 76
Salicylic Acid as a Disinfectant 93
Teachers, Duties of 68
Tests of Impurities 73, 85, 102
Tramps 31
Trustees, Duties of 67
Typhoid Fever 13, 95, 111
Typhus Fever 91–105
Temperature 72, 81, 91, 137
Ventilation 53, 75, 88
Varick, T. R. 103
Vital Statistics 4, 12, 18, 35
Water Supply 28, 63, 83, 93
Tests 83, 101
tight Shafts for Wells 95
Wells 64, 94
Work of Board 14

REPORT

OF THE

BOARD OF HEALTH

OF THE

STATE OF NEW JERSEY

1878.

II.

TRENTON, N. J.:
NAAR, DAY & NAAR, PRINTERS.
1878.

REPORT

OF THE

BOARD OF HEALTH

OF THE

STATE OF NEW JERSEY

1878.

II.

TRENTON, N. J.:
NAAR, DAY & NAAR, PRINTERS
1878.

State Board of Health.

	P. O. Address.
Elias J. Marsh	Paterson.
Laban Dennis	Newark.
Cyrus F. Brackett	Princeton.
James M. Ridge	Camden.
Theodore R. Varick	Jersey City.
Ezra M. Hunt	Metuchen.
E. A. Osborne	Middletown.

Hon. Henry C. Kelsey, Secretary of State, Ex-Officio.
Hon. John P. Stockton, Attorney General, Ex-Officio.

President	Elias J. Marsh.
Corresponding Secretary	Ezra M. Hunt.
Recording Clerk	E. A. Osborne.

Report of the Secretary of the Board.

To His Excellency, George B. McClellan, Governor:

The State Board of Health of New Jersey begs leave to make report to your excellency in reference to those matters which concern the interests of health and life among the citizens of this State.

The past year has been one which has of itself prominently set forth the great dependency of civic and material welfare and prosperity upon the health of the citizen. It has shown the terror and embarrassment of epidemics, has drawn most earnest attention to the sources of mortality and in many ways illustrated the effects of localities, employments, conditions and circumstances on the public health.

By a wide spread scourge our whole land has been awakened into sympathy, while within our State there have been localized outbreaks of disease and prevalent sources of ill-health, which have attracted the attention of our citizens. Two persons died within our State of yellow fever. One arrived from Memphis at his father's house in Closter, Bergen county, in apparent good health. Another death from yellow fever is also reported to us from Long Branch.

It is well to remember that New York county and city had from yellow fever over 2,000 deaths in a single year, over 3,000 between 1798 and 1806, that New Jersey had outbreaks at about the same time in five different places, that Philadelphia between 1793 and 1805 numbered from it over 10,000 deaths and that at times since, and notably in 1822 and 1853, it has had a considerable mortality as near us. As it has been the habit of the epidemic to appear successive years in other cities after once gaining headway at central points, we may not be without guard lest our own State should directly suffer from it in exposed localities.

But the occurrence of such an infection is not merely of interest as it concerns one disease or the section especially exposed to its ravages.

The infections of remittent or periodic fevers, of scarlet fever, diphtheria, and many other allied diseases have a history so similar and analogies so suggestive, that the study of any one of the species is a part of the study of other groups.

As to each and all, the most radical question is that of origin. Where and how is the poison generated? Is it only an exotic or is it a native? Or having once been exotic has it become naturalized?

Is it produced within or without the individual? Can it multiply itself so that the person comes to be a source of infection? Is the infectious particle made active by changes after it has left the body? What effect thereupon or upon the person falling sick is produced by surroundings?

Many such questions propound themselves for answer and it is well for all to know that with patient, laborious, hopeful work origin is being studied and some most important facts are awaiting classification and interpretation.

A next important and more successful study is that of the mode of propagation. If we do not know the origin, yet if we can determine the modes and circumstances of propagation of these various infectious diseases, we are thus able to get at facts which help us to limit them.

If we may not catch the infective particle which is the essential cause of chills and fever or the whole train of periodic fevers, yet if we can find that proper drainage limits it, that there are conditions of enforced vegetable decay that intensify it, that avoidance of too early or late exposure, or sleeping in high and dry apartments, or the use of a little bitter extract each day will protect us, we have gained important knowledge for ourselves and for the State.

It is for such reasons that the history of diseases, and of their modes of invasion and spread, becomes of such vital importance to society. We are learning that our most hopeful dealing with many diseases is likely to be in the direction of prevention, rather than in the discovery of specifics for cure. This will bring much of the welfare of the citizens under the care of the State. State medicine has already a wide

and weighty sphere in that it attempts to diminish the necessity for so great reliance on hospitals, asylums and other invalid resorts. It would conserve the interest of the citizen and the material welfare of the State by expending something for prevention and abate the necessity for so lavish expenditures in retention or cure.

We are to remember that not only epidemics disturb the natural course of population and load burdens grievous to be borne upon communities. There are silent forces at work, causing deterioration of health which although without sudden outbreaks are nevertheless potent for reduction and destruction. Like the small steady fire of an infantry corps they kill as many in the aggregate as does the heavy ordnance which occasionally wheels into action. Consumption with its thousands of victims and disorders of the digestive canal which carry to the grave such numbers of children are in a very large majority of cases manufactured diseases. They directly depend upon foul and overheated air, the moisture resulting from impeded evaporation, bad drainage and improper feeding, and improper construction of buildings. In the study of these there is a sphere for preventive medicine, not a whit smaller than that which demands attention through sudden or periodic invasions. The social condition of the people, which means the welfare of the State, is largely interested in the prevention of all preventable sickness.

PROMINENT DISEASES.

The two diseases to which in our State our attention has needed to be attracted for the past year are malarial fevers and diphtheria.

In the prevalence of periodic fevers we have shared in common with portions of adjacent States. Their tax upon material interests is not to be measured either by the number of deaths, nor on the other hand strictly by the number of plainly declared cases. These are not for the most part acutely fatal but so cling and linger and recur as to deduct largely from the health, comfort and resources of the people. Besides they often leave a lowered vitality, or organs permanently embarrassed, so that their record is mingled with that of other diseases or registered in a lowering of the average vital power and labor capacity of the citizen.

Science and experience have so clearly indicated the attendant circumstances of this infection, the conditions under which it acts and remedies not only curative but preventive, that the prevalence is all the more the pity.

There can be no doubt that in certain states of atmosphere, as to heat and humidity such miasms are more active at one time than another. But if only proper drainage is secured, proper precautions exercised by individuals and families, a proper preventive taken, it is in our power to largely abate the nuisance. Already in our own State some advance has been made by the extended drainage of one or two localities.

Our character of soil, the situation of our water sheds and water courses, the massing of great cities toward tide water, and some other considerations, point to the need of more active attention to this subject.

Where cities and railroads are building and new avenues opening there is not only neglect of drainage but aggressive disturbance of ground arrangements favorable to proper water delivery. Hence, while so well able to avoid, no State is more likely to accumulate the causes of malaria or to interrupt by art provisions once well secured by nature.

There is also especial interest attaching to the fact that in the case of the malarial fevers it is known that not only by drainage and precautions, but by the use of certain articles for the individual we may prevent the manifestation of the disease.

This means that by preventive treatment of the person we are able to put in the blood or tissues a something which somehow interferes with the action of the infective particle either by destroying it, by suspending its activity or by so fortifying the system as to render its efforts unavailing.

If this be so, the question very naturally arises whether in regard to other infective material we may not somehow be able to place within the blood or tissues some substance interfering with its supremacy, and thus abort the infection.

Scarlet, yellow and other fevers, as well as diphtheria, measles, erysipelas and allied diseases have hopeful prospects in this direction.

Some of our greatest studies in the political economy of the future will be as to this and other methods of limiting disease.

Diphtheria still continues to recur as an endemic or local outbreak in various portions of the State.

We are not yet able to speak of its causes with that definiteness which is desirable.

It is a disease of country districts even more than of large cities. Although it is spread by infection, it is not apt to become malignant unless warmth and moisture are able to find animal organic materials for its fertilization or dissemination.

Separation even at a short distance, careful ventilation and the avoidance of water-wastage or dampness within buildings do much to aid in the limitation of the disease. It is being carefully studied by physicians, engineers and sanitarians, and by isolation, cleanliness and disinfectants, we are able more than formerly to abate its ravages, where we can secure the employment of known methods. We note with interest that under the patronage of the Sanitary Association of this State, a survey is being made of Paterson, Jersey City and Hoboken, and the most of Hudson county. Geological structure is carefully mapped, and each house noted in which death from diphtheria or other infectious diseases has occurred. Already some facts of value are elicited. Our returns of vital statistics as they will be secured by the law at present in operation, will greatly aid in the study of epidemics.

The Board so soon as it shall have secured accurate data hopes to study both periodic fevers, diphtheria and other diseases with that careful analysis which their frequency demands, and which numerical methods so greatly aid.

The attention of the Board of Health has been called to the prevalence of typhoid fever in Montclair, and in the Reform School, at Jamesburg, beside the occurrence of isolated cases in various portions of the State. This has been called a disease of civilization and of modern improvements because its causes are so often and distinctly traceable to man and his own artistic appliances and conveniences.

This little brief from some citizens of Montclair sufficiently outlines the outbreak there:

"A report having gained wide circulation that Montclair has been during the past season the scene of an alarming epidemic of typhoid fever, we desire to present the facts on which the report above named was based. The disease had its origin in a

small house on Park street. The family occupying this house sold milk. The well which was near the house contained filthy water. The cellar contained various kinds of uncleanness. All the cases of typhoid occurred in the families supplied with milk from this house. The typhoid poison in some way (probably through the medium of the well water,) found its way into the milk, and was thus distributed through the neighborhood. The whole number of cases which presented typhoid symptoms was thirteen, the majority of them being very light. There were five or six severe cases and three deaths. The disease was confined to a very small locality, and did not, at any time endanger those living beyond its immediate influence. It was never in any sense epidemic in the town. Montclair has an area of seven and a half square miles, and a population of about five thousand; it occupies an elevated position, its average height above the sea level being about three hundred and fifty feet, and its highest point about six hundred and fifty feet; it lies on the easterly slope of Orange Mountain, the land having such inclination as to afford almost perfect drainage; it is remarkably free from malaria, and is in a general way a very healthy place. The death rate last year was less than nine per one thousand inhabitants—a better exhibit than is shown by the healthiest town in Massachusetts. (See report State Board of Health, 1877.) Typhoid fever is a disease of very rare occurrence. At present there is not a single case in town, and we can assure our friends that there is no cause for anxiety on our account.

"WILLIAM A. TORREY,
"THOMAS RUSSELL,
"CHAS. L. BENEDICT,
"J. J. H. LOVE, M. D.,
"J. W. PINKHAM, M. D., etc."

The epidemic at Jamesburg was directly brought to the attention of the Board by the Trustees, and a thorough investigation made thereof. As a part of our report will be found a paper as to it. If the occurrence were exceptional or accidental, it would be of only passing interest. But there is good reason to believe that many cities and multitudes of private houses in this State are busy accumulating just such sources of infection, either

showing their effect by a general loss of vigorous health, or likely at some future time to declare themselves by a deadly outbreak.

The locality especially illustrates how a porous soil, of sand and gravel with an impervious clay several feet below may be able for a long time to rid itself of all organic material, but finally so fail as that wells and houses become impregnated with the products of decay. Many towns along our seacoast are filling up rapidly and have not as yet suffered. In their formative periods they give fine advantage for sanitary foresight and construction, while future prospects warrant plans in accord with the best scientific practice. But most of them rely on opinions not expert, so far as sanitary advice and execution are concerned, and are "dabs of sanitation," well advertised as of the most approved methods. The health resorts of England have recently been the subject of several important reports which should warn and instruct us as to the value of prevision.

Evidence both in Europe and our own country has now accumulated sufficiently for us to affirm that fevers known as typhoid, cesspool, etc., and depressions of health vaguely called malarial, are mostly the result of air, earth, or water contaminated by the confined and retained excretions incident to our habits, to house-life or to crowdings of population. Disease is not so accidental and inexplicable as once supposed. It is generally not a mishap, but is providential that mankind, chastened for neglect and warned into a higher regard for natural laws, may secure a higher development.

Our attention as a Board has been called to some private nuisances and infringements upon private rights. Under our present laws there seems to be no available remedy if a neighbor fouls the well of an adjoining lot by placing his out-door conveniences in closest proximity to it. In a case investigated by a member of the Board, the water supply of a small village is very seriously interfered with by embankments made on public works, and in the opinion of most of its citizens there has been an increase of sickness since. A brief report thereupon is herewith transmitted to you. We can point to localities in our State where, by such constructions, the water level has been made much higher and lands made wet and boggy, which before had fair natural drainage. The remedy for these in-

fringements upon private rights must be chiefly furnished by those who fully comprehend the equities of public and personal rights, and who know how technically to frame laws so as to meet all contingencies.

OFFENSIVE TRADES.

During the past years the Local Government Board of Great Britain has published an important investigation into offensive trades and the best methods of conducting them harmlessly. Our own State suffers much from offensive factories, moved out upon it from adjacent cities. These are important industries, but there is no excuse for their being so great an evil to the surrounding vicinage. With a proper outlay science and art now demonstrate how they may be rendered innocuous, and even the odors fully abated. Where such is the case the fact of the nuisance is still more inexcusable, and should be reached by the restrictions of law.

REGISTRY LAW AS TO VITAL STATISTICS.

The Board regards the new law as to the registry of marriages, births and deaths a most important one in the interests of the population, and for the progress of sanitary reform.

There are some slight modifications of the law which will add to ease of administration without weakening its efficiency. It has so important a bearing, not only as a legal registry, but as a guide in vital concerns, that there should be close adherence to the judgment of those who have thoroughly studied the science and art and utilization of vital statistics.

This is in charge of the Department of State, but its medical supervision is under the advisement of the Board of Health. When due provision is made for the clerical force needed in dealing with the large aggregate of returns, we shall be able to gather from them more valuable data and to trace with more exactness the localities, causes and outspreading of disease.

The inconvenience unavoidable in any radical change of method has been found much less than anticipated and we have concurrent testimony as to its general success. The return of marriages and deaths will show a large increase. The birth re-

turns will be less complete in numbers until the duty is enforced, but are of far more value, and in some districts these also show a large increase in return of numbers. Many of our physicians make their returns with business accuracy and promptness and especially those who rank highest in the estimation of the profession.

The law has brought the Board into correspondence with all the cities of the State as well as the townships, and has secured returns from every township and every city. It also corrected a limiting amendment in a former law by giving the State Board power of inquiry in all matters pertaining to the public health alike in city and country.

As to those whose duty it has been to make return of marriages it must be said, that with many oversights and neglects, the former law was nevertheless so carried out as to be of service as a record if not as a basis for vital deductions. Clergymen, Justices, etc., not only were not paid for their certificates, but besides were compelled under penalty to pay twelve cents for each record they have made at the county seat. The present law is much more convenient, involves no expense, and secures fuller returns at less cost to the State. We have heard no complaint from this class, but are rather indebted for some suggestions in perfecting blanks.

Neither as a rule do the educated class of practitioners object to making their returns without special compensation. Their practical exemption from all jury duty is a deliverance which to the most of them is a boon quite equivalent to the two or three hours a year spent in filling out blanks.

Still more when the duty is conceded to be imperative and a honorarium in most countries, and in 1874 was made the general law of England under the sanction of the most eminent members of the Royal College of Physicians and Surgeons, and has been accepted in most cities of our country, objections should be exceedingly strenuous and demonstrative to lead us to substitute our personal views for those of the profession. The present State Board argued this point with some of the fairest legal minds of the State. They were not slow in perceiving what physicians ought to perceive for themselves, that all such exactness of method and record of the results of practice is always in the common interest of the profession it concerns. There are always in every

liberal art duties which do not admit of exact pecuniary reckoning and compensation, yet which performed always accrue to the welfare of the givers, and so each really becomes a sharer in a general pecuniary reward.

The law assumes that there is or ought to be skilled attendance amid the perils of disease and birth, and makes it as it really is, to the interest of every one in such peril to have responsible attendance. While there have been many views as to methods of tabulation and the details of forms, we have never known a careful study of the subject to leave in doubt those who thus got thoroughly before their minds the entire facts in evidence. A reasonable comment on the tendencies to respond to such a view has been furnished by the fact that the best returns are now found in those places where a strict system was already in operation or where it is entirely new. The greatest difficulty has been experienced in towns where by reason of slackness in former administration, a neglect of ordinances had come to be felt excusable.

While the law does add some additional care to undertakers, yet it is to be remembered that any one else may obtain the permit as well as themselves and the obligation put upon them to be assured of its securement is much easier than that system of undertakers' license which is sometimes required.

We do not need, we think, in this State to discuss the necessity of such a law. It has been upon our statute books from our earliest legislation; has received from time to time amendments and some improvements. In the meantime other states and countries, so far from undervaluing, have inclined to make vital statistics the starting point for all statistics as to material conditions, and have largely increased the facilities for their securement. Still more have they become a part of those studies of population now considered vital to the interests of every nation. It is well known that the leading agency in the great work of state sanitary reform in Great Britain has been the Registrar General's Department, and that to it as a guide the Local Government Board has looked in all its more important measures for the welfare of the people. The same must occur in every state as in every profession where the study of the preservation of health is recognised as a weighty public concern.

ADULTERATION OF FOODS.

The attention of the Board has been invited to adulteration and impurities of food, drinks, medicines and illuminating oil.

In times when we are very properly concerned over the interests of labor and the depreciation of compensation and employment, it is well to remember that the wages paid is not the only test of value. It is an important question whether the laborer in return for his money receives an equivalent of such material as his money entitles him to, and as aids him in his work. There are certain protections against adulterations and against dangerous articles on sale and in necessary use, which the individual cannot secure for himself and which must come through the warnings and penalties of legal enactment. The compositions of breadstuffs, of artificial butters and cheese, the condition of slaughtered meats and of liquid foods, the risks in canned fruits and artificial drinks, the value and the safety of burning fluids, all these and such like matters must be inquired into and guarded by the State. An article in one of the leading journals speaks thus:

"There is a demand for severe legislative enactments against the adulteration of food. This is indeed a subject well worthy of the attention of legislators. The wretch who adulterates articles of food is nothing but a poisoner and should be treated as such. This country is certainly blessed with an abundance of cereals, dairy products and meats. While we export enormous quantities of these products to Europe, we often forget that inferior and adulterated food is sold to our own people by unscrupulous dealers. We are all familiar with the operations of the skim milk dealers. While in New York and other states such persons can be brought to justice, we do not know of a single statute in New Jersey which reaches the adulteration of food of any description. It is true that in some of our largest cities we have meat inspectors, and occasionally these functionaries will seize a piece or two of meat unfit for use, but here the matter rests. Oleomargarine can be sold for butter in this State without punishment, sawdust for mustard, marble dust and powdered lime may be found in large quantities in our flour barrels, and the skim milk dealer may carry on his nefarious, yet murderous

trade without fear of molestation." Our laws as to all these are imperfect.

A member of the Board has been appointed to make special inquiry as to food adulterations.

ILLUMINATING OILS have, the last year, enforced the need of some legislation for protection from accidents therefrom.

The press of the State has recorded a large number of accidents. In Newark two persons were burned to death in one week, and similar accidents have been of no infrequent occurrence elsewhere. The November number of the *Plumber and Sanitary Engineer* says: "We began some three months ago collecting such notices of kerosene accidents as we found in the daily papers of this city, but they have accumulated so fast that we cannot publish them *seriatim*. Thus far from our incomplete collection, we might furnish our readers with names and residences of ten unfortunate women burned to death, and men and women badly injured and a large number of fires caused by it. These damages are assessed from $40,000 down. When in search of information about some of the cases in the coroner's office in Brooklyn, we were informed that the oil causing these accidents was frequently or generally above the legal standard."

"It is ascertained, with a reasonable degree of certainty, that about seven thousand persons are slaughtered and six thousand seriously wounded annually in the United States by this deadly fluid. In addition to this, the loss of property reaches into the many hundreds of thousands of dollars. This need not be so, and should not be so. The law should fix a standard test which will insure safety beyond peradventure, and provide the severest punishment for the manufacturers and vendors of explosive kerosene. The State owes it to her citizens to protect them from such great danger.—[*Cincinnati Price Current.*"

The inquest March, 1878, on the body of Catherine Foley, of Jersey City, whose death resulted from the explosion of a kerosene lamp, showed in the expert testimony that what is admitted as strictest refined petroleum by the rule of the New York Produce Exchange is not always safe, although answering to the "burning or fire test," it does not come up to the flashing test.

Prof. H. B. Cornwall, of Princeton, has given much attention, as have various other chemists, to the testing of specimens, and has kindly furnished us these notes, which are more important and conclusive than any mere statements.

NOTES ON KEROSENE.

Kerosene is made from petroleum, which contains several different compounds of carbon with hydrogen. The petroleum is heated in stills, and the very inflammable and volatile liquids which at first are condensed are known as gasoline, naphtha and benzine. Any of these give off at temperatures below 100° Fahrenheit, gases which are very easily ignited and form with air explosive mixtures. After these have been driven off from the petroleum, the kerosene is collected, and if the refiners begin to collect the kerosene from the condenser of the still too soon, it will also contain more or less benzine or naphtha. It is the presence of these in badly refined kerosene which renders it dangerous, because they pass off from the kerosene as gases at very moderate temperatures and in dangerous quantity. If the dealers put benzine or naphtha into good kerosene the result is the same. It is not possible to say certainly whether the injurious ingredients have been left in the kerosene by the refiner or put in by the dealer. Since naphtha and benzine command a much lower price than kerosene, there is a great temptation to sell kerosene containing them.

The quality of kerosene can only be practically ascertained by what is known as the "*flashing test.*" The kerosene is put into a glass vessel holding somewhat less than half a pint and filled nearly to the top. This glass is placed in a metal vessel of water, so that the water rises as high outside as the kerosene inside of the glass, and the water is then slowly heated by a small flame under the metal vessel, currents of air being shut out by a detached screen. By means of a thermometer, whose bulb is just immersed in the kerosene, the temperature of the oil is observed. At every increase of two degrees or so in the temperature the oil is well stirred, the gases are blown from its surface and after a moment or two of rest a very small flame is passed steadily and rapidly across the oil, *not touching its surface,* but at about one-quarter inch distance. If a blue flicker-

ing flame flashes transiently across the oil it shows that *the temperature has been reached at which the oil gives forth inflammable vapors.* This is called the *flashing point.* Since it is the gas thus given off which, mixed with air and ignited by the lamp flame or otherwise, causes the explosion and since, further, an oil heated to this point, if spilled near a light by any chance, such as the upsetting and breaking of a lamp, will be at once set on fire by the ignition of the gases escaping from it, it follows that no oil is safe which gives off such gases at temperatures to which oil is ordinarily exposed in common use.

Dr. C. F. Chandler, of New York, has shown that the average temperature of the oil in thirteen glass lamps, after burning some time in a room of which the temperature was from 90° to 92° Fahrenheit, was 92⅛° Fahrenheit, while the oil in one lamp showed a temperature of 98° Fahrenheit. Any oil that will not stand the flashing test at 100° Fahrenheit is manifestly liable to cause accidents by explosion of gas from the oil mixed with air in the lamp.

A common cause of accidents is the breaking of lamps. It has been shown (*American Chemist, June, 1876,*) that when a lamp containing oil at a temperature of 95° Fahrenheit is lighted and broken by dropping on the floor, oils which flash below 100° Fahrenheit will at once take fire from the gas which is ignited by the wick, while oils that stand a flashing test of 100° will be ignited but very slowly if at all; those which flash at over 105° to 110° not being ignited unless by *actual contact of the burning wick with the oil.* It is, then, the gas from the poor oils which takes fire from the lighted wick of the broken lamp and causes the instantaneous ignition of everything on which the oil has fallen.

It is unfortunate that any other test for oil has been introduced, but most oil is sold by another test, viz: the *fire test,* which means the temperature at which the oil itself takes fire from the ignited gas and continues to burn, when tested in the glass vessel, as above described for obtaining the flashing point. This *fire test* is fallacious, for it is not invariable. While one oil that stands a *fire test* of 110° may stand a *flashing test* of 100°, another of 110° *fire test* may *flash* at 80°, and it must not be forgotten that it is the escape of inflammable gases at a low temperature which occasions all of the danger in ordinary cases.

What constitutes a safe oil? Probably it would be desirable to make the *flashing point* not lower than 110° Fahrenheit, to ensure perfect safety, but since this entails a considerably reduced production of kerosene from a given amount of petroleum, it may be regarded as settled that a *flashing point* of 100° Fahrenheit will be a much more easily procured standard, while it will secure undoubtedly a reasonably safe oil.

I have examined five kerosene oils that actually occasioned explosions in this State, the lamps being burst, not broken by upsetting. They showed the following *flashing* and *fire tests*:

	FLASH TEST.	FIRE TEST.
No. 1	79° Fahr.	99° Fahr.
2	76° "	85° "
3	82° "	106° "
4	84° "	105° "
5	94° "	111° "

These figures show that every oil flashed below 100° Fahrenheit, although three had a *fire test* above 100°, one, No. 5 at 111°, being *one degree better than standard kerosene of the New York Produce Exchange.* It is most unfortunate that this *fire test* was ever introduced. It means nothing, it confuses the public and it has furnished the means for evading the just penalty of the laws against the sale of dangerous kerosene. Many States have adopted 100° *fire test* as the lowest limit, but it has been repeatedly proven and is well known to all who deal in kerosene, that a 100° fire test oil *must be unsafe under all circumstances.* The *flashing test* is the only safe one. The statements of prominent refiners support the view that a 100° flash oil while reasonably cheap is reasonably safe. I have never met with a case of an accident from such an oil.

Experiments show (*Amer. Chem. loc. cit.*) that an average poor oil, flashing at 86° Fahrenheit, can be brought up to the safe 100° flash test by removing six or seven per cent. by distillation, and Mr. H. N. Rogers, of Chas. Pratt & Co., informs me that an oil of 110° *fire test* would yield about eight per cent. less of a 100° *flash oil.* At eight per cent. greater cost, at most, the ordinary poor kerosene could be made safe, and the oils would still burn just as well in ordinary lamps. At present these safe

100° flash oils are rare have examined fourteen ordinary kerosenes in one day and only found four good ones. There are a number of safe, high grade oils in the market, flashing at 110° to 125° Fahrenheit, but they are necessarily higher priced, because the demand for them is small in comparison with the cheap, bad oils. If legislation forced the production of safe oils alone, these still safer oils would become cheaper.

The eight per cent. removed from the kerosene by distillation is not a dead loss. It still has a value, although less than one-half as great. Even if a dead loss it would now be only one cent a gallon. The gain to the community by freedom from danger to life, person and property, and the gain to the refiners and dealers by increased sales of a commodity no longer regarded as probably dangerous, may be offset against the former loss. I hold letters from prominent refiners stating that they greatly desire legislation to improve the quality of kerosene. The insurance companies would probably say the same.

Of the five oils described a few pages before, three caused fatal accident, and two would have caused fires had not fortunate chances prevented. They are fair types of such occurrences, taken just as they came, the only source of information in four cases being one New York paper. How many similar accidents occur in the whole State in a year I do not know, but certainly enough to make the question an interesting one to the Board of Health.

Any legislation on the subject must be decisive and must provide a penalty and means for enforcing it, on refiners as well as dealers. Several States have excellent laws; several have useless ones. The law of New York State is useless, with its 100° *fire test;* the law or ordinance of New York city with its 100° *flash test*, has done a great deal of good. Common people will have the cheapest; they will burn *pure benzine* if it is cheaper than kerosene. I tested one sample which killed a girl in Jersey City. It was simple *benzine*, and worse than gunpowder.

I add a list of oils I have tested:

	FLASH TEST.	FIRE TEST.	
No. 1	78°	.. ..	
2	104°	120°	
3	81°	.....	
4	82°	.....	
5	80°	98°	
6	79°	104°	
7	101°	.....	
8	99°	116°	
9	77°	100°	
10	104°	.....	
11	115°	127°	Sold as Pratt's Astral Oil in Princeton.
12	83°	.....	
13	80°	.....	
14	79°	99°	Exploded in a hall lamp and nearly set fire to the house. The lamp was nearly full and burning quietly.
15	86°	107°	
16	94°	111°	Exploded in a lamp quietly burning and nearly set fire to the house.
17	118°	135°	Pratt's Astral.
18	80°	100°	
19	98°	112°	Vesta Oil.
20	99°	112½°	" "
21	127°	149°	Home Light Oil.
22	128°	148°	Anchor Safety Oil, Princeton.
23	142°	154°	Anchor Safety Oil, five months later.
24	76°	85°	Exploded in lamp when blown out, and killed a woman.
25	119°	139°	Pratt's Astral, Princeton.
26	82°	106°	Exploded after burning some hours and killed a woman.
27	84°	105°	Exploded in a kitchen and killed a woman. No fire in the vicinity of the lamp.

The danger of the oils flashing below 100° Fahrenheit; the uselessness of the 100° fire test, and the very common use of bad oils, are sufficiently shown by the above list. As regards the high grade oils it should be added that a small dealer in New York city told me he filled Pratt's and other marked cans with *any good oil!*

It is certainly time that our State should have definite legislation on the subject, both in the interests of life and property.

The whole matter of adulteration of food, drinks, artificial lights, etc., is so important that we believe our legislators should at once enact such a law as will protect our citizens from imposition. If also provision was made by which the State Board could employ one or more public analysts, at a very moderate expense, society would be largely protected from the daily impositions practiced. We commend the subject to the careful attention of your Excellency and the Legislature, and are ready

when called upon to aid in any method which will accomplish the purpose.

As a part of this report we beg leave to present to your Excellency as follows, several papers, which we believe will be found of much value to the citizens of this State, and will aid to guide our legislators as to some of the best methods of conserving the public welfare.

I. Report of State Board of Health at the Governor's request, "On the disposition to be made of the criminal insane."

II. Report on an outbreak of enteric (typhoid) fever at the State Reform School, Jamesburg, by E. M. Hunt, M. D.

III. A report on the diseases of hatters, by L. Dennis, M. D.

IV. A paper on springs, wells and cisterns as sources of drinking water, by Professor H. B. Cornwall, Ph. D., Princeton, N. J.

V. A paper on sewers by E. A. Osborne, C. E.

VI. A paper on vaccination, by E. J. Marsh, M. D., President of State Board.

VII. Outline of the work of the New Jersey Sanitary Association, by E. M. Hunt, M. D.

VIII. Veterinary report, by J. C. Corlies, D. V. S.

IX. Report on interrupted water supply, at New Village.

X. Climatology.

XI. Report of vital statistics to June 1, 1878.

I. At the request of your Excellency that we would inquire into "the proper disposition to be made of the criminal insane," the Board appointed two of its members to make careful examination into all the evidence they could command.

Diligent investigation led us to the views expressed in this report, and met the approval of the Board. While it is a subject admitting of a diversity of opinion, it needs to be more fully studied by philanthropists, physicians and alienists. We are convinced too that our State charities and penal institutions, while well superintended, need to be strictly compared with those higher laws, the neglect of which does not indicate mal-administration, but the studious recognition of which might make them more useful for reformatory, educational and economical purposes. System so easily degenerates into routine, that what is

conservative is easily reckoned as radical by those who have not re-studied the great questions of insanity, pauperism and crime, and the management of their victims by the light of modern methods of inquiry and practice. They are great personal, civic and State interests and ever need most earnest supervision.

II. The report on the outbreak of enteric fever at the State Reform School, Jamesburg, is in itself so forcible an illustration of what may happen from faulty construction or concealed embarrassments under able superintendence that it is valuable as a warning and incentive, to secure a prevention or correction of similar evils in many a public and private residence of the State. We are glad to bear testimony to the earnest efforts of the Superintendent and Trustees to secure an improvement of inside apparatus, sewers, water supply, etc., as rapidly as the limited funds at their command will permit.

III. The report on the diseases of hatters is but one of very many reports needed as to various industries. It is but a specimen of what evils may result in various trades and occupations. The most of these are avoidable. Even where deleterious substances have to be used the provisions of chemical and pneumatic art are such that the workmen can generally be protected from harm. Our State has large manufacturing interests in iron, pottery, glass-blowing and many other trades especially subject to enervating influences. At one time capitalists looked with suspicion upon any effort to improve the condition of working-places or methods having regard to the health of employees, as they might entail expense upon employers. Men of narrow views may still be found who secretly, if not avowedly have these groundless fears. Our ablest and most successful manufacturers are coming to know that the health and comfort of the skilled workman is a part of their own success. He who summons the artisan to his aid for executing an art from which he expects to receive reward, should see to it that his laborers can do their work free from all unnecessary perils to health, life or cheerfulness. If not it is the common interest of the State and of every citizen in it to strive to secure such a result. This report important as to one class, will be of still further service if it will awaken attention to the avoidable exposures in various de-

partments of industry, with a view to their remedy or abatement.

IV. The paper on springs, wells and cisterns as sources of drinking water specifies the qualities of good water, precautions against impurities and furnishes an outline to guide all householders against the evils which so constantly result from a contaminated water supply. We are able thus to present in condensed form instructions which need to be heeded by every citizen of the State. The evils of bad air, imperfect food and impure drinking water are sometimes manifested in sudden outbreak of disease, but more frequently in a general lowering of the standard of health. There is help to society and great comfort to the individual in deliverance from all avoidable burdens.

V. The paper on sewers will be found to present methods of construction and other points of great importance to cities. Evidence is constantly accumulating as to the evils arising in cities from these underground conveniences and even from the drains and cess-pool connections of private country houses. There is need that the attention of our citizens be carefully directed to the subject.

VI. The subject of vaccination is so important that we cannot too earnestly call attention thereto. The evils of small pox and the value of this protection are sufficiently well known. So long as we were dependent for our supply of vaccine upon matter taken from others, some had a fear of the transfer of human diseases. Some physicians believed in the very rare possibility and so this was a fear and with some valid and plausible reason might lead to hesitation. Since now we can avail ourselves of the vaccine virus direct from the cow no objection founded on risk of the transfer of bad blood can stand. It is the plain duty which every citizen and every child owes to every other that the risk of the small pox contagion should thus be well nigh abolished. Many countries now have and enforce a law of compulsory vaccination. Many claim it as applicable here. Still more claim that when we offer the public school as a gratuity we have the right to make vaccination a condition of entrance. Even if we trust to the voluntary plan, with our

present school system of yearly enrollment, and with the aid of our system of vital statistics, it would not be difficult to ascertain each year how many children over a given age are unvaccinated.

Nor would it be difficult whenever public opinion or intelligent legislation request it for the Educational and the Health Board so to co-operate as that inexpensive and reliable vaccination might be secured to all district schools at some period of the year. We are able to suggest a plan by which such a satisfactory result could be very generally secured.

Other matters are fully treated in the paper which forms a part of our report.

VII. During the last four years there has existed in the State a sanitary association of citizens. Its yearly meetings bring together persons of various callings who feel a deep interest in the health of our citizens, and recognize, both in city and country, avoidable causes of disease. Papers of permanent interest, which have never been published, have been read by physicians, teachers, engineers, etc. As valuable extracts could be made therefrom, this outline has, by permission, been prepared for this report, in order that our citizens generally may avail themselves of the most important suggestions. This is but a mere synopsis of the chief contributions. These and the other papers can be consulted in manuscript.

VIII. In accord with the direction of the law, that the Board should "make inquiries and report in reference to diseases affecting animals and the methods of their prevention," we have, from the date of our organization, noted the most common diseases and the efforts of veterinary medicine in its cure thereof.

Two facts soon became apparent. The descriptions of disease as reported were too general to admit of indentification, and the professional education of most of those practicing among animals in New Jersey has in the past been so imperfect as to leave us with but few sources of information. Veterinary medicine and surgery has long since taken rank as a profession collateral to that which cares for the human kind. In each experience is of great value, but it is that experience which is acquired on the foundation of careful study and exact scientific

knowledge. A correct practice can only be the outgrowth of such methods as are applied to other arts which have a science as the basis. Much of our cruelty to animals is in that promiscuous treatment which they receive when sick, or that want of sanitary care which induces disease.

While there has been some general inquiry as to epidemics or endemics among stock, and an occasional contribution on the subject, no systematic effort has been made to trace the prevalent diseases in our State, or to record such facts as might aid in their investigation.

More recently several graduates from the New York Veterinary College have settled in New Jersey, and these, with the very few reputable practitioners previously here, afford a hopeful nucleus of information. While the opinions of stock raisers and those who have to do with animals is to be noted, just as every good physician listens inquiringly to the statements of nurse or parent, yet there can be no hope of skillful management until men, well trained in this department, make of it both a study and a practice.

We procured the names of those who were best authenticated, and after consulting prominent members of the State Agricultural Society, invited Dr. A B. Corlies, Veterinary Surgeon of Newark, to co-operate with the Board in its work. The plan is to place ourselves in correspondence with some proper person in each county or township, so that knowledge of any outbreak may promptly come to our notice and the character thereof be duly traced. Some advance has already been made in this direction, and a few notices of special cases will be found in the paper herewith transmitted.

In the introductory it was thought proper to give soms descriptions of the diseases of cattle and horses most to be dreaded or which have already appeared in the State. These, although brief, will serve to guard against their introduction and to acquaint dealers in stock with their general character. We shall hope in future reports to deal more closely with the diseases in our own State and be able to designate methods for the better care of this great material interest.

IX. The report on interference with the water supply of New Village, was prepared in reply to a petition made to the Governor

of the State, and signed by about thirty persons, which we think included over three-fourths of the male citizens of the town. The facts of their petition were fully confirmed by E. A. Osborne, C. E., who made a survey of the locality. The evil still remains, because persuasion has thus far failed, and there is some doubt whether any provision on our statute book reaches it. But it is of value as illustrating a defect such as exists as to many other matters. In a good government it is often necessary in health interests to give plenary power and then confide in the judgment of the persons intrusted. Far more liability of assault upon private rights and public welfare accrues from delayed remedy or defective power than from peremptory jurisdiction when the parties exercising it have both character and position at stake, and would be compromised by a mistake of judgment or by undue severity under conferred powers.

X. The importance of climatology and the study both of meteorological and telluric phenomena is fully recognized by the Board. The relations of heat, air, winds, moisture and of sudden changes to the public health is undoubted, and has its ascertainable laws. The subject is a difficult one and for this reason all the more it needs that patience which can wait for results and that extent of observation in different States and localities by which a mass of information may be secured. Returns are kindly furnished us by the Signal Service Bureau, which has five stations along our coast, with an earnest request for similar returns from observers in the State. Other observations are made at several points in behalf of the Smithsonian Institute.

As the instruments for observation are expensive and the work is valueless unless it is accurate, the Board has deemed it wise to place instruments for the present at a northern and central portion of the State, as Cape May, with its Signal Station, represents the most southern latitude. The instruments placed at Princeton will be under the supervision of Professor Brackett, and the one at Newton in charge of Dr. Haven, the Librarian of the Dennis Library.

Observations were not commenced until Fall, and no report is made therefrom for this year.

Professor Brackett and E. A. Osborne, C. E., are a special com-

mittee to oversee the conduct of this work and aid will be secured from our ablest observers.

We are this year again indebted to Hon. Wm. E. Whitehead, of Newark, the veteran observer of the State, for his perspicuous meteorological tables. We call also especial attention to the comments thereupon contained in his monthly letters.

Special attention is called to his July letter, all the more important because of certain meteorological conditions coincident with the epidemic at the South and which have been carefully noted at Memphis, New Orleans and other points.

After remarking that the meteorological phenomena of the month were at variance with previous experiences and new at least to the present generation, he says:

"July was, in some respects, an exceptional month. The extreme heat, which lives in the remembrance of all, commenced on the 27th of June and continued with only slight modifications, on some days with increased intensity, to the 10th of July, the mercury rising every day above 90° (on three of them above 95°) making *fourteen days in succession* thus characterized. The largest number previously recorded in any one of the thirty-five years covered by these reports was *seven* in July, 1845. There were *five* in August, 1853, July, 1854, and July, 1856; *four* in July, 1843, June, 1848, June, 1849, July, 1866, July, 1872, and July, 1877; but, generally, only two or three in succession have been experienced.

"Although there was only one inch of rain fell during the whole fourteen days, and that on four different occasions—on 4th, 8th, 9th and 10th—yet there was so much humidity in the atmosphere that nothing like the ordinary effects of drouth were apparent, but it was conceded that that humidity added to the number of victims to "sunstroke," which was unusually great, especially in some of the western cities.

"On the afternoon of the 11th some welcome clouds obscured the heavens, and in the evening rain set in, which continued to fall in showers during the 12th to the depth of an inch and eight-tenths; so lowering the temperature that the maximum of the day was only 73½°, and the mean temperature 71¾°, the lowest recorded until the 30th.

"The force of the caloric wave was, however, not yet exhausted.

On the 15th 93° was attained, and on the 18th, 19th and 20th, 97°, 97½° and 94° respectively, the 19th having the highest mean of the month, 86¾°; for although the maximum of the day was three-fourths of a degree less than was experienced on the 3d, the minimum, 76°, was higher than on any other day of the month. After the 20th the heat, although on some days very oppressive, was not so great, 90° not being again reached. Light clouds during the morning of the 29th culminated in the afternoon in others of greater density, effectually obscuring the eclipse of the sun, which had been waited for with much interest, and bringing a copious rain of nine-tenths of an inch during the night and following day. The temperature of the last two days was in consequence materially lowered, so that the 31st was the coldest day of the month; the change working such a diminution in the mean of the whole month as to prevent its being exceptional in that respect, as it bid fair to be.

"As less than six-tenths of an inch of rain had fallen (on two occasions, 18th and 20th) since the 13th, the rain of the 30th was very acceptable, but the humidity of the atmosphere, notwithstanding the extreme heat, was a noticeable feature throughout the month, and consequently, at its close, there was no material diminution in the beauty of the emerald tints of the fields or the rich verdure of the trees—with the exception of those of the paper-mulberries and horse-chestnuts, the leaves retaining a firm hold upon the parent stems.

"The month's mean temperature, 78.25°, exceeded that of all but one of its name during the last thirty-five years, and was four degrees and six-tenths above the average of the whole number, which was 73.65°. The mean of July, 1876, was 78.31°, a fraction higher than the last. The other hot Julys of the series were, 1856, 76.07°; 1866, 76.08°; 1872, 76.79°; 1877, 77.86°. The month was exceptional in the number of days having a temperature of 90° and over, fourteen being thus characterized; the greatest number in any previous July having been ten in 1876 and 1877. The maximum temperature of the month, however, was exceeded in four of the series, 1843, 99¼°; 1849, 99¾°; 1866, 98½°, and 1877, 99°. Its minimum, 61½°, was above the minima of all but that of 1872, which was 62½°.

"Opinions were expressed in some quarters during the month

that the heat was not so oppressive as in July, 1876. One fact connected with that month may have led to that opinion. The nights of July, 1876, were warmer than those of July this year by two and a half degrees, so that there was less recuperative power derived from the rest they afforded, and the heat of the days consequently rendered more oppressive. The mean temperature of the nights of the last month was, however, more than three degrees above the mean of the preceding thirty-five Julys, having been exceeded by the nights of two only, 1872 and 1876.

"The observations of the Signal Service Bureau sufficiently demonstrated that the heated current which for two-thirds of the month swept over all the Eastern, Middle and Northern States, took its start far in the northwest, beyond the limits of the United States, moving southwardly and eastwardly with a speed that outstripped the winds; and although the question has been asked, 'Who can estimate the value of a fact?' yet in this instance it must be admitted that the fact elicited would be more valuable if its 'why and wherefore' could be determined But, notwithstanding the progress made in the science of meteorology in late years, it must be acknowledged that more is known of *effects* than *causes*. What were the peculiar circumstances from which were evolved the atmospherical phenomena that originated, and then set in motion, the heated elements, is not explained by the discovery of the region of their development. There are many philosophers, no wiser than Horatio, to whom the things of Heaven and earth are still mysteries unsolved. The time will come, however, as prophesied by Prof. Loomis more than thirty years ago, when the meteorological maps of the Signal Service, giving the condition of the elements daily throughout the whole United States, will show more definitely the origin of atmospherical phenomena such as we have recently experienced.

"The locusts were first heard on the 14th, about a week earlier than last year.

"The barometrical range was between 30.240 observed on the morning of the 12th, and 29.700 on the morning of the 22d, the mean of the morning observations being 30.041 and of those in the evening, 30.016.

"The thermometers gave the following results:

"Maximum temperature, 3d, 98¼°.
"Minimum temperature, 23d, 61½°.
"Mean temperature, 78.25°.
"Highest daily mean, 19th, 86¾°.
"Lowest daily mean, 31st, 67¼°.
"Greatest daily range, 1st, 27½°.
"Least daily range, 30th, 2½°.
"Mean daily range, 19.694°.

"The daily maximum temperature was once 98¼; once 97½; once 97; once 95¾; once 95½; nine times between that and 90; ten times between 90 and 85; three times between 85 and 80; once between 80 and 75; once 73½; once 72½, and once 69.

The daily minimum temperature was once 61½; six times between that and 65; thirteen times between 65 and 70; ten times between 70 and 75, and once 76.

"Fair weather prevailed equal to about eighteen days. It rained in measurable quantities on eleven days and sprinkled on one other, to the depth in all of 4.330 inches, very little more than the average of the month in thirty-five years, which was 4.283 inches, the greatest fall during that period being 8.535 inches in 1868, the least 1.120 in 1861.

"The predominant winds were from points between N. W. and S. W.

"W.

"Newark, August 1, 1878."

Report on the Disposition of Insane Criminals.

To His Excellency, George B. McClellan:

On the receipt of a request from your Excellency that the State Board of Health would express an opinion concerning the proper disposition and treatment of insane criminals in this State, the Board appointed a special committee to consider and report on the subject.

That convicts who have the misfortune to be insane are entitled to the same care and skill in the treatment of their maladies, as other persons of unsound mind, has not been under serious discussion in the present century. It has been settled also by almost universal custom that such treatment should be conducted in buildings having special arrangements and appliances suited to the peculiar cases of the sufferers in question.

The real question to be considered in our report is this:

Are there good and sufficient reasons why convicts who become insane should be treated or retained in hospitals or asylums separate from all other insane persons?

As the question in some of its aspects is not new it may be profitable to inquire how it has been treated in other States and countries where an enlightened and Christian civilization prevails.

The practice of the Continental nations is clearly brought to light in the following extract from Mr. Manning's report on lunatic asylums (1868):

"The almost complete absence of special provision for the criminal insane of all classes which exists on the Continent of Europe, is very remarkable; but it is in accordance with the opinions of the public, and of many of the most distinguished alienist physicians, opinions which have found expression in various pamphlets, and in papers and journals devoted to matters psychological. It is held that insanity should level all distinctions, that the great gulf which separates the convict from

the honest man is bridged over by insanity, and that the bondsman should be as the free; that when sick in body the prisoner should still be kept in his prison and treated for his malady; but when sick in mind the prison should be opened and the badge of the convict forgotten."

When we remember that many of the most valued writers and authorities on the care and treatment of the insane are to be found among the French and Germans, such language is very significant.

In Great Britain the case is somewhat otherwise, for we find at Perth, in Scotland, there is a "criminal lunatic asylum." It is a part of the general prison of Scotland, but yet is under the charge of a special superintendent. This asylum is not, however, in strictness one for insane convicts alone, since it receives as well those who have committed acts of a criminal character while under an insane impulse. The asylum, however, presents the character of an institution for a distinct class, and this impels us to give in full, so far as relates to the subject, an excellent letter from its able medical superintendent, John McNaughton, M D.:

"SOUTHVIEW GENERAL PRISON,
"PERTH, 10th Sept., 1878.

"DEAR SIR:—I received your letter yesterday and have much pleasure in answering your questions so far as I am able.

"Our Criminal Lunatic Department consists chiefly of two distinct classes of inmates, viz: those who have been found by a court of law to have been insane while committing the crime charged, and therefore condemned to be detained as lunatics during Her Majesty's pleasure; and secondly, those who became insane during their term of imprisonment.

"Now with regard to the first class they, in the vast majority of cases are homicides, subject to more or less frequent homicidal impulses, in many cases with long perfectly lucid intervals between. With these we put all whose propensities are distinctly homicidal.

"For this class of criminal lunatics I hold that a separate institution upheld by the State is almost indispensable, as it confers on us the power, gives us the means, and holds us responsible for the detention of prisoners, though apparently perfectly sane,

so long as there is the slightest danger of any recurrence of the homicidal tendency, whereas if confined in an ordinary parochial asylum, the authorities, considering the generally crowded state of their establishments, and the desire to keep down the expenses, could hardly be blamed or held responsible for discharging a man as soon as he has again regained his reason.

"This argument applies very forcibly to one class of homicides, viz: dipsomaniacs, as those patients very shortly after confinement and the cutting off of the supply of drink, generally become perfectly sane, but they are not then, and I question very much if they ever can become fitted to be again allowed with safety abroad.

"Take another class of homicides, those who have committed murder through puerperal mania. We have power from the State, if thought necessary, to detain these women at least till after the childbearing period, which would not only be very difficult but almost impossible to do in our ordinary asylums, as now constituted.

"Now considering the second class, those becoming insane during their imprisonment. They are put here for treatment with homicides. If remaining so at its termination, we as a general rule transfer them to the asylum of the parish to which they belong, where they can generally be very well treated along with the other inmates. Even in those cases we have the discretionary power, through the Secretary of State, of detaining them at the expiring of their sentences, when we consider them unfitted for an ordinary asylum, but in very few cases do we require to exercise this power, as they are generally simple cases of insanity resulting from depraved moral and physical habits.

"Your next question, whether they incline to escape more than other lunatics? I cannot well answer, as ours are so confined as to prevent the smallest possibility of such an attempt being successful, and seeing its futility, none have ever, to my knowledge, made the attempt.

"Once a patient has been received into our Lunatic Department there is almost no inducement for him to feign insanity, rather the reverse, as he knows his chances of again being set at liberty entirely hinge on his mental state.

"In our ordinary Convict Establishment, for which I am also

medical officer, we have numerous cases of feigning insanity to escape punishment, or to be released from their imposed task.

"As a general rule, I should say, taking them as a class, our criminal lunatics are much more unmanageable than others, seeing they principally come from the lowest and most degraded orders, hence being naturally of a suspicious and jealous nature, with no curb on their passions to begin with, when insane, one can imagine they will take far more tact and a firmer hand to manage them than ordinary lunatics.

"Considering that over sixty per cent. of our inmates are homicides, attempts at violence are very much more common than amongst the same number of ordinary lunatics.

"I am sorry I cannot direct your attention to any literature which fully discusses the question of separate criminal asylums, but will be happy to give you any other information in my power should you desire it.

"I know of no other Criminal Asylums than those you name, although I am aware they detain lunatics for a certain time in Millbank Convict Establishment.

"Believe me, dear sir, sincerely yours,

"JOHN MCNAUGHTON, M. D."

It will be seen from this that in his judgment, a separate provision for those disposed to homicidal acts, is fully as important as for those who are insane convicts.

An asylum of similar character exists at Broadmore, a few miles from London. It receives insane convicts from the government prisons, and also those who being found to have been insane at the time of the committal of a criminal act, are condemned to be detained as lunatics. Its entire management is similar to that of an ordinary English asylum. It has no special provisions for security beyond those which may be found in the best asylums in this country.

At the expiration of sentence, the rule is to discharge the convict insane and to remand them to other asylums.

The Irish asylum at Dundrum is of a similar character.

Fisherton House, near Salisbury, is a proprietary asylum, available, however, to parishes and county prisons, for the detention of insane paupers or insane persons convicted of minor offences.

While all these are worthy of study, giving as they do, some information respecting special classes of insane persons, none of them shows the result of entire separation of convicted insane persons from all others. Indeed the experience of the medical officer at Perth would rather show the need of providing for the care of other classes of insane persons before setting apart an asylum for insane convicts alone.

In the United States, notwithstanding the organized efforts of the "Association of Asylum Superintendents," we have as yet no separate asylum for the treatment of insane convicts.

In Massachusetts various attempts have been made to secure the separation of insane convicts from other insane persons; and the Legislature has passed votes favoring such a result, but nothing decisive has been secured in favor of separation, till recently. It is now ordered that insane convicts be treated at a hospital connected with a prison.

The new prison at Concord is to have a "special department adjacent to the prison, which will accommodate about thirty insane persons."

It so happens that on no point are our correspondents so unanimous as in discouraging the building of such an asylum or hospital near or in connection with a prison. Says one of the former assistants in the Auburn Asylum, who is now connected with the Insane Asylum at Danvers, Massachusetts, "I should especially urge the importance of not building too near a prison, as the environment is pernicious. Get the insane convict off a reasonable distance in the country, with plenty of farm work, fresh and good living, and not only would some good cures be effected, but there would also be many persons wholly reformed." Similar observations are made by the Superintendent of the Taunton Lunatic Asylum.

The nearest approach to an institution for the convict insane in our country is near the State Prison at Auburn. A large proportion of its inmates are, however, unconvicted insane persons. The asylum is placed on a lot of six acres—a part of the prison grounds—and is enclosed by a stone wall. The present Medical Superintendent very properly objects to its proximity to the prison. It was first occupied in 1859, and has had a varying and complicated history. It was originally intended for insane convicts only, but in 1869 it was made to receive those who had

been acquitted on the ground of insanity. It is worthy of note, however, that formerly "from one-third to one-half of the persons transferred to the asylums from the state prisons were certified by the medical officers of the prisons to have been insane when received into them, showing them to have been insane at the time of sentence." The following letter from the able Superintendent of the asylum is important:

"Respecting the propriety of confining persons whose insanity has led them to commit, or attempt, homicidal acts, I may say that, in my opinion, there are cases of this kind which it would be manifestly unjust to confine, in common with the *convicted* insane. The wife, for example, who destroys her infant during an attack of puerperal mania, or, in fact, any individual whose life, prior to the occurrence of insanity, has been exemplary or at least not criminal in character. In this State the statute wisely provides that 'when a person accused of the crime of arson or murder, or attempt at murder, shall have escaped indictment, or shall have been acquitted upon trial upon the ground of insanity * * * * the court shall order such person into safe custody, and to be sent to one of the State lunatic asylums, or to the State Asylum for Insane Criminals at Auburn, at the discretion of the court.' This is intended to prevent injustice in the disposition of such cases, and, practically, it does so whenever the courts see fit to exercise the discretion allowed them.

"I may state in this connection, a fact which has been observed in this State and which has struck me as being noteworthy, namely, that a large majority of the persons who have been acquitted of, or have escaped indictment for the acts mentioned, on the ground of insanity, have led immoral lives previous to their insanity, which, in many cases is the direct entailment of their immoralities.

"It is the custom here to classify patients according to the form of their insanity without much regard to the crimes they may have committed; but my observation leads me to conclude that those who have committed acts of violence against the person are more dangerous, but, as a rule, not more inclined to escape than those who have been convicted of crimes not violent in character.

"All of the penal institutions in the State can, under the statute, send patients to this asylum.

"In respect to the production of moral degredation among the good by contact with the bad I think that the rule which applies to the same holds good, other things being equal, in the case of the insane.

"I have no statistics to show that 'the chances of mental and moral recovery are better by the separation,' but I have no doubt as to the effect upon the moral nature of an innocent, pure-minded individual who is compelled to associate with the vicious and immoral while undergoing treatment for a disease which for the time weakens all of the mental faculties.

"Convicted patients, in case of recovery, are returned to prison; but if they remain insane on the expiration of sentence they may be transferred, upon the approval of the State Commissioner in Lunacy and the Superintendent of Prisons, to the custody of the authorities of the county from whence they were sentenced to prison, or friends may remove them on furnishing evidence of ability, as well as a written agreement, to care for them; provided, (in both cases) that they are regarded as harmless and not likely to be benefited by further treatment in the asylum. If considered dangerous, or curable, they must be retained here.

"Believing I have answered your inquiries, I am,

"Very respectfully, yours,

"CARLOS F. MACDONALD."

We regret the paucity of statistics concerning the life history of insane convicts, but facts, which have plenty of coroboration, compel us to believe that not a few of those who clearly show themselves to be deranged while undergoing sentence in prison were of unsound mind at the time when they committed the act which placed them there.

In Pennsylvania the provision of a separate asylum for the class in question has been urged upon the Legislature by able committees of asylums, superintendents and others.

A commission appointed to consider the matter reported to the Legislature in 1875, advocating a separate asylum for six classes of insane persons, as follows:

1. Dangerous insane persons who have committed or shall

attempt murder, arson, rape, robbery or other high crimes or misdemeanors.

2. Those charged with committing either of the crimes before mentioned who are believed to feign insanity, or of whose sanity there may be so great a doubt as to require the investigation of experts.

3. Those acquitted of such crimes on the ground of insanity, who shall be adjudged by the court trying the offence, as persons dangerous to be at large.

4. Those charged with the commission of either of such crimes while sane, and becoming insane before trial or sentence.

5. Those becoming insane while in prison, after conviction of any crime, and continuing insane through the term of sentence, who shall not have friends or relatives to whom such insane persons may be delivered at the expiration of sentence with safety to the community.

6. Insane convicts generally, whose insanity shall have been ascertained, and who may be transferred in accordance with the laws of this commonwealth.

The persons included in the fifth and sixth classes to be received by the proposed institutions so long as there shall be no separate hospital exclusively for their accommodation, and no longer; and while in this institution their association with other inmates to be regulated according to the discretion of its superintendent.

It is clear that if these recommendations are carried into effect it would finally decide against the erection of a separate asylum for insane convicts.

Unfortunately the legislative acts and inquiries of other States cast no additional light on the subject of this inquiry.

We have now to notice the very decided opinion of the "Association of Asylum Superintendents" in favor of a separate asylum or hospital for insane convicts.

Although there seems so much unanimity of opinion respecting the resolutions formally passed at the annual meeting at Baltimore in 1873, (see *Am. Jour. of Insanity, Oct., 1873,*) yet in the discussion there is apparent not only wise limitation of the position taken on the part of some, but wide diversity of view on the part of others.

In the absence of classified facts at this discussion, it was rea-

sonable to hope that there would be forthcoming exact tables which would show the prison record of each convict, relating to the character of his or her insanity in all its details, so far as they could be ascertained, including suspicions of heredity phases, violence on the one hand and imbecility on the other, etc. It is not too much to say that strong assertions have not been supported by clinical observation widely extended, so as to render induction safe, except as they have been embodied in general statements.

One Superintendent forms his judgment in a crowded asylum, to which are sent from prisons only the dangerous insane. Another says I would, if it were in my power, apply this rule (of separation) not only to epileptics, but also to dipsomaniacs, and hence I have never appreciated the importance of separating criminal lunatics in ordinary institutions for the insane. While he (Dr. Nichols) thinks they should not be promiscuously placed in wards, he has also the same opinion regarding some other classes.

Dr. A. M. Shew, of the Hospital for the Insane, Middletown, speaks thus:

"Three years ago the Legislature of Connecticut passed a law requiring the trustees of the hospital at Middletown to receive all insane convicts, after a proper examination, which was specified, and a commission appointed. We had no separate provision and were obliged to receive them in the hospital proper, and place them in association with the other patients. Since that time twelve insane convicts have been transferred from Wethersfield to Middletown; two of that number have escaped; one of them feigned insanity; arrangements had been made to transfer him to Wethersfield, but he escaped the very night before the transfer was to be made. Of the ten others, seven have been among the most valuable farm laborers, harmless, industrious and peaceable, and yet positively insane, much less dangerous than many of the chronic patients we have."

We have carefully collated the reasons given in the various discussions within reach and find them to be as follows:

(*a*). That the character of insane convicts requires greater safeguards both as to the buildings and in the administration.

To this it may be replied that it can hardly be asserted that

the convict insane require such safeguards or such special constructions as cannot be secured in parts of buildings already erected. There are few who would claim that the convict insane need closer surveillance than do the homicidal insane who have attempted criminal acts.

One of the most prominent advocates for separate asylums (Godding, Superintendent of Taunton Lunatic Asylum, 1871, p. 130,) would make also "distinct provision for the homicidal insane, including with them the incendiaries, a small but very dangerous class."

A lady of fine culture subject to emotional and periodic insanity, who spent considerable time in two different asylums, often as a sane observer, insists that the dangerous and demoralizing class in most insane hospitals is the dipsomaniac class.

They have often lost all self-restraint, are vicious and ungovernable, and disturb both the order and morale of many an institution.

A gentleman now in private practice, but for many years connected with asylums, and consulted as an alienist, tells us that this view is undoubtedly correct.

(*b*). That insane convicts, as a class, require closer discipline than the general average of asylum patients may be true, but it is, we believe, not shown that because of any special peculiarity in the type of their insanity, do they need special hospitals more than do those disposed to homicidal acts, or more than do incendiaries or other classes that might easily be named.

Indeed, in one of our own State asylums, "of the forty-six cases transferred from the State prison to the asylum, thirty-four still remain with us. Most of those brought us are either demented or the tendency is to dementia, and hence, incurable."

Our asylums at present are built not merely as hospitals, having reference to the peaceable insane, but also with reference to the fact that there will be many inmates of a dangerous or extra-hazardous character. Unless it can be shown that the convict insane far surpass all other classes in the element of danger, the argument which presents them as requiring an asylum, and constructive safeguards with expert administration surpassing all others, is not well supported.

(*c*). An argument which is very prevalent and influential is that it is the right of the innocent insane not to be associated with

the "convict insane." "The State has no moral right to compel its honest citizens, sane or insane, to associate with criminals." The author of this proposition declines to offer any support other than "the simple statement of the fact is enough."

That this has not been conclusive to all minds is shown both by direct expression of opinion and by the habit of all countries and States thus far, which do place with the convict insane, those who in the innocence of insanity have committed homicidal acts. While we have great respect for sentiment and the moral conviction of men after due examination had, yet we cannot so hastily conclude on this simple statement that it may not be right or expedient to treat in the same hospital the insane convict with other insane persons—the classification being on a different basis.

The social science student suggests "that the two classes are often not separated on any principle of moral responsibility, as the insane convict is frequently one who was suffering, at the time of his act, under a disability that the courts failed to detect at the trial for want of proper defence, or because the mental disease was still latent." Also that "insanity suspends punishment, based upon previous conduct, and there is, therefore, no reason for any separation based upon moral ground, or any separation except such as is founded upon the natural aversion of the inmates and their friends to such association."

The writer reminds us that it is not fair to represent every convict as a murderer, an outcast, an inevitable wretch. Not all even of the inmates of State prisons are such. Some are undergoing sentence for what the law calls minor offences. If all higher class (or paying) patients were excluded from our asylums, we should find closer bonds of relationship between insanity, pauperism and crime than the superficial observer would otherwise detect. Society does receive back to itself the convict whose sentence has expired and endeavors, often successfully, to prevent such persons from any repetition of criminal acts. It is not moral obliquity to claim that, in relation to the inmates of an asylum, the convict has had expiration of sentence when insanity has vacated penal punishment, and that the asylum is not degraded or endangered by his presence any more than society is by receiving him back to itself.

If the question of insanity were set aside there are many in

asylum wards who would be demoralized by the grade of the inmates. If it is correct to say, as Dr. Gray did, that "a large number of those acquitted on the ground of insanity are essentially of the criminal class," the same might be said of certain other persons found in our asylums.

Our asylums are intended first of all for the pauper or dependent classes whose relation to lost self respect, to inherited evil, to indulged vice and crime has often been such as to forbid our making such incisive distinction between some insane *paupers*, and some insane *convicts*.

When insanity has invaded both and the law of charity has suspended that of retribution we cannot say to every convict, "Still the mark of your crime must be upon you even though insanity has suspended punishment."

The following letter, from a former Asylum Superintendent, an eminent physician of our own State, expresses a view fast gaining ground:

"BURLINGTON, August 23, 1878.

"*To the Secretary of the State Board of Health, of N. J.:*

"MY DEAR DOCTOR:—My own conviction is, that there are no sound reasons for separate institutions for those who are called 'criminal insane.' The term itself is an unfortunate one, if indeed, it is not a misnomer. Insanity precludes the idea of voluntary crime, and occuring in a person who has been previously convicted of crime, and imprisoned, removes the criminal view of his case, and places him on the list of insane persons. Every well defined disease has its recognized pathological character, and the moral state of the sufferer does not alter the pathology of the case. So, every form of insanity, has its own characteristic lesion of structure, or functional disturbance, and I see no more reason why the glandular ulceration which characterises typhoid fever, should be different in a criminal from what it is in a saint, than I do why the cerebral lesion which gives rise to mania or paresis, should be modified by the moral character of the individual. If the pathology therefore does not differ in the criminal, why should the therapeutics? There are convicts in prison who may become insane, and there are insane

persons in asylums who may commit crimes that would consign them to the penitentiary, but for the fact of their insanity; and there is no evidence of any difference in the psychical state, or in the pathological condition of such, to warrant their separation from other insane patients, that is not already provided for in the massive and elaborate appointments of our lunatic asylums.

"The number of convicts who have become insane, and of insane, who commit crime, is so small that it would seem unwise to spend more than the millions that have already been expended on lunatic asylums, for the separate custody of the class referred to. It would seem to be especially unwise in view of the fact that a considerable proportion of the insane in our asylums are harmless, and could enjoy more freedom, be made more comfortable, and have a better chance of recovery, in less expensive and more home-like establishments.

"Admitting the necessity of removing criminals who become insane from prisons, is it not safe to conclude that the cellular plan of our asylums, together with their admirable hygienic arrangements, and the provision for constant and intelligent medical care which they furnish, can be made to meet such necessity by the establishment of criminal wards, and a further classification of inmates, so as to include the so-called 'criminal insane?' I am aware that it is common for alienists to advocate the construction of separate institutions for the class under consideration, and that by such advocacy there is engendered a sentimentalism which takes the form of horror at the thought of contaminating the 'innocent victims of insanity' by the presence of 'dangerous criminals' from the penitentiary. With this unphilosophical view, there is, however, but little sympathy among those who recognize the great truth, that, insanity in criminals and saints alike, is a terrible scourge, which neither respects nor even recognizes rank, or wealth, or culture, but levels all alike to a common scale of broken and dependent humanity; and that, whether the accident of crime, or disease, or misfortune, or sorrow, be the exciting cause, it comes to all its victims with the same dreadful blight, and should be met by an equally wise and generous care.

"I am, my dear sir, yours most truly,

JOSEPH PARRISH."

Thus much it is proper to say, although we fully realize the unfitness of certain insane convicts to mingle with the average inmates of the asylum.

Regarding types of insanity, and the influence which might be exerted over certain classes of patients, and even regarding the sentiment of insane persons not wholly bereft of reason, we would favor special provisions in the care of those whose acts had been specially notorious; but so would we also in other individual cases equally dangerous, equally demoralizing, equally shocking to the prevailing sentiment of the better class of the insane and their friends.

We believe that the tendency of sound opinion based upon experience and reasoning is toward many separations and classifications of the insane in our asylums, which will in time, supercede much of our present ward systems, vacate many of our palatial structures, distinguish between the hospital and the asylum, provide farms and industries and treatments far different from those which at present prevail, thus opening questions of grand import, vital in the future and of interest to all who care for these unfortunates, whom as well as the poor, we have always with us. What we now claim is that the insane convict, like any other insane person, is to be dealt with as an individual, and not as belonging to a class. If he be an idiot, we see no reason for a special hospital for him. If like the homicidal madman or the illusionist, or the incendiary, he requires special guard, that he should have. If his crime has been of a nature so abhorrent as to be singled out, he may be placed with those unconvicted inmates, whose presence in the general wards may, for any reasons, be equally degrading or demoralizing.

What we feel to be the need of our State is that, one of its asylums should have such special provisions as to permit the consignment to it, of all cases, which in the judgment of proper authority, should be separated from the general average of asylum patients. We can see no objection to the use of an extreme wing of our largest asylum; or if there is no room in it, to an annex a few hundred feet therefrom, connected by a corridor, and specially fitted for the reception of all classes of extra hazardous insane. To this should not be attached the odium of a convict hospital. In it, however, might be placed

the homicidal insane, those inclined to arson, and others recognized in all asylums as dangerous and difficult of classification.

We confidently believe that if there is no inflexible routine policy in the management of our State institutions, the force of sentiment, conviction and economy will lead us to thus provide for our more degraded classes, whether pauper or penal, and at the same time secure to some supported at private expense, facilities of separation more valuable than can be secured by merely singling out a class, having no just reference to the type of their insanity or the degree of their insubordination.

CYRUS F. BRACKETT,
EZRA M. HUNT,
Committee of State Board of Health.

This report has been submitted to the Board and ordered sent to your Excellency, with its approval.

Report of an Outbreak of Enteric Fever

at the State Reform School, Jamesburg, N. J.

BY EZRA M. HUNT, M. D.

Under date of August 15th, 1878, I received a letter from Samuel Allinson, Trustee of the State Reform School, stating the existence of sickness at that Institution, and asking the counsel of the State Board of Health. He says: "Within the last two weeks not less than twenty boys have been in bed with fever, and with typhoid symptoms. There have also been a number of cases of dysentery and a few of diphtheria." "The premises, kept scrupulously clean and neat, have been examined, but no adequate cause for such distempers has yet been developed. The water, food, sewage and labor have all been rigorously questioned, without satisfactory response. I have been at the School several times within a week, as have other of the Trustees, but I fear the disease may not yet have run its course. There must be some local cause, as the neighborhood is not affected, as it would be were the cause atmospheric." The next morning I visited the Institution for the purpose of ascertaining the character and cause of the outbreak.

We listened to the history of the endemic from A. J. Knappen, M. D., the Physician of the Institution. He resides at Jamesburg, three miles distant, and is the only physician of this immediate section. Occasional cases of fever, which he regarded as typhoid, had occurred in his practice, but none recently. He had not been able to connect the outbreak with any neighboring conditions. No local causes had been discovered. He regarded the fever as of a typhoid or typho-malarial tpye, and thought it endemic in its character. Up to early spring the health of the Institution had been uniformly good, but in March, and since, there had been many cases of sore throat of a diphtheric type. Malarial fevers were not uncommon in adjoining neighborhoods, but there had been no unusual prevalence this summer.

Some of the pupils had complained more of headache and of stomach and bowel disturbance than usual. The doctor and others recognized the fact that for several months the health of the Institution had not been up to its high general average. The number of boys at present in the Institution is two hundred and eighty—the usual number for the last two or three years having been two hundred and fifty. The attendants increase the whole number of persons to over three hundred. The boys are divided into four families, occupying (except when together for eating, work, &c.,) four different buildings, known as No. 1, 2, 3 and 4.

OUTLINE OF THE PRESENT EPIDEMIC.

Early in July a case of sickness occured of marked febrile character. The boy had been necessarily kept for ten or twelve days before in a small room in the attic of the main building, known as No. 4. He belonged to the family of boys of building No. 3, situated as shown on the ground plan, and died in that building the third day after he had first been seen by the physician. He was always stolid and reticent when troublesome, and no doubt concealed his sickness at first. Before his transfer he had used at night the water-closet of No. 3, and afterward was allowed to go to the outside privy used in common by the families of No. 3 and 4. In going from his room he passed the well, known as the chain pump, and obtained water from it. When the attention of the Superintendent was first called to him, he at once recognized his condition as serious. The doctor found him with rapid pulse, high temperature, some diarrhœa and an eruption. His sickness, while under his observation, was so short as scarcely to admit of positive diagnosis.

The second case occurred the second week of July, or about one week after the death of the first, and the same week there were five or six new cases, most of them from the families of Nos. 3 and 4. Since then new cases had continued occurring to the number in all of thirty-five. For them a new upper room in No. 2 was being used as a hospital in place of the former small hospital in No. 4. At the time of my visit, August 16th, I found twenty-six in bed in the hospital proper, and five more in the convalescent room outside. A few others were listless, and

evidently avoiding the hospital. It is not necessary to give in full my clinical notes as the only point here in place is identification of the disease. The temperature had been noted once each day, and the fever might rank as remittent or continued. We examined several with reference to the rose colored rash. Some had a fading rash, but none distinct at this visit. Two or three had sudamina; none had had intestinal hemorrhage, and only a few diarrhœa. On my visit August 20th several more had been added to the list. Many were mildly sick, and a few with sordes, delirium, and other critical symptoms. We found a distinct rash in one of the more recent cases. From this time on for about two weeks new cases were constantly occurring, but the disease did not assume a more critical character, and quinine was being freely used as an antipyretic, and seemed to answer its purpose well, except in two or three cases.

Another of the boys died August 24th. That there might be fullness of evidence as to the diagnosis, I secured Dr. E. G. Janeway, Professor of Pathology, in Bellevue College, New York city, to conduct with Dr. J. P. Knappen and myself, a post-mortem examination.

The following is an abbreviated outline of appearances: Right lung nearly normal; left lung had lobular pneumonia of the upper lobe without any discharge, but at one point abscess was forming; other parts of the left lung were congested; the heart was of usual size, walls not thinned, valves complete; the liver was somewhat enlarged but healthy; the spleen was not softened and nearly of usual size; stomach healthy; mesenteric glands—numbers of them enlarged and varying in size and hardness—some of them softened; duodenum and jejunum nearly normal; ileum congested, at points enlarged and ulcerated; commenced its examination at cæcum; an ulceration on the iliac surface of the ileo-cæcal valve; ulcerations in the lowest of Peyers' plates; the patches raised and enlarged; more than a dozen distinct ulcerations extending along three feet of the ileum; one of these had reached the peritoneal coat; solitary follicles raised and infiltrated and prominent at many points; colon healthy, except congested just below the ileo-cæcal valve; kidneys normal, except slight granular change of the epithelium.

The examination, together with further observation of the

sick in the hospital, left no doubt in our minds that the prevalent disease was enteric fever, and even seemed to dismiss the question whether it might not be typho-malarial or a type of some more general form of septic fever.

EXAMINATION INTO THE CAUSES OF THE OUTBREAK.

On our first visit, careful study was made of outlines preparatory to a fuller investigation.

There was no prevalent epidemic in the vicinage and sporadic cases of fever long before did not seem to give any connecting clew.

The milk and food supply was questioned in detail but nothing found suspicious in this direction.

The location would not account for the sickness unless malarial.

The ground is a table land with fair declivity in three directions and a greater slope to the east. The opportunities for drainage and for carrying off sewerage are excellent.

The surface is a gravelly loam and loose gravel not stratified for a depth of ten to twelve feet, when a uniform layer of clay is reached, impervious and so causing all soakage to seek outlet in any excavations deeper than this and rain water to find its way out along at the edges, and especially to the east, to which the slope most inclines.

The absence of any effect to others from lowlands in the distance, precluded a purely malarial origin to a fever, which at this time might have been assumed to be of a mixed character.

The housekeeping of the institution, and its management in all its appointments, on a close inspection of rooms, beds, laundry, kitchens, etc., seemed so good as to be a model for any such institution. Indeed to this, we must attribute in some degree the milder character of most of the cases.

By the method of exclusion attention come to be necessarily fastened upon the water supply and the sewer system indoors or out as in some wise bearing upon the sickness. The buildings located as shown upon the ground plan were then examined with reference to these.

Building No. 1 had its own water supply from a well beneath. Although this was of questionable utility, yet it was not a surface well and not apparently exposed to any impregnating causes.

The fall is good for all house wastage, most of which is emptied outside. The whole situation of the building seemed to us in a sanitary view, the best of any. It had no water closets or laundry. The outhouse is on a side hill, with rapid fall and is easily kept in order.

Building No. 2, several hundred feet to the east, has no inside water closets, and good out-door arrangements. Its storm water like that of No. 1, passes outside. Like it, it is heated by its own hot-air furnace. The bath and the water basins empty by a pipe into the drain of No. 5, but it is well trapped. The drinking water is derived from a well under the building and seems rather more exposed to surface contamination from the bath room and the proximity of other buildings than that of No. 1.

Building No. 5 is next to No. 2, about one hundred feet to the south. The lower part is occupied by the engine room and laundry; most of the first and second floors by a work shop for shirt making by boys from the various buildings. The entire laundry work for all is done in this building.

The dormitory on the third floor was occupied by thirty-four boys. On the same floor in a new extension are the rooms recently occupied for a hospital. It is heated by steam from its own boiler. Formerly the exhaust pipe entered into the inner sewer, but as steam and bad odors were found to come from an upper water closet, the exhaust was changed to the outside. There is but one water closet in the building and this near the hospital, which was very little used and not well trapped. Its soil pipes joins the sewer which carries the laundry and waste water under the building and is carried out to join the main sewer from No. 4.

Its water supply is from the same reservoirs which supply No. 3 and No. 4, hereafter to be noticed. Its supply pipe comes off from the suction engine, which draws the water from the reservoirs and sends it to No. 4, from which No. 3 is also supplied. Thus it will be noticed that these three buildings have a common water supply distinct from No. 1 and No. 2. This building also has at a distant sewer entrance, connection with the sewerage of No. 4. But as there is little soil matter in this building and as the laundry water is carried through a fall to meet the main sewer outside, it is not closely connected therewith. Besides as only one floor is occupied by thirty-four boys as a dormitory, the

building is used more for bakery and workshop purposes than for housing inmates. The soil here for the excavation of the new parts of the building is very gravelly.

While close examination has been made of all these buildings and some few matters seem to need correction in construction arrangements, the history of the first cases of outbreak and defects seen in the first examinations of the other two buildings must lead us to be even more suspicious as to them.

Building No. 4, as shown upon the ground floor, occupies a central position among the other buildings. It accommodates the family of the Superintendent, and is the dining place of all the boys and furnishes dormitories for about seventy-five.

The basement floor is about four feet below the surface, and is occupied for kitchen, dining-room and administrative purposes. The first floor has auditoriums, school-rooms and rooms for the administrative officers, while dormitories and other rooms needed occupy the second and third stories.

This is the only one of the buildings which can be said to have been fitted up with all the modern improvements.

INSIDE WATER CARRIAGE.

The water supply from reservoirs at a distance, hereafter to be more fully noticed, enters the house from a main in the basement, and is lifted by a steam-pump into a large cistern in the attic for distribution. There is also a hot water tank in the attic, the water of which is heated in the basement, carried by a pipe up to the tank in order to be distributed for washing, bathing or other purposes. This was introduced in May or June of the present year. The up-going pipe, which carries the hot water, passes in its length close to the soil pipes for the whole building.

SOIL PIPE.

This commences in the attic, as the overflow pipe from the cold water cistern, so that it may be flushed by water therefrom, as frequently as desired. It has in the attic a deep U bend, or water-seal trap, to prevent the outflow of gases, but has no ventilation out upon the roof just adjacent. Although the depth of

his bend at first seemed quite sufficient to make an effective trap, the mode of its placement showed that only from one-half to one inch of water-trap could be secured in it. When the new hot water tank was set up in May a small tube for steam escape was passed from it to enter the soil pipe about an inch beyond the trap. This was a constant dryer of the water in the trap, and had so affected a joint just beyond as to cause water to drip therefrom. Thus the trap was really ineffective. A tin leader letting water from the roof into the soil pipe on the lower story, would serve some purpose to ventilate the soil pipe, but as the long sewer outside had no opening, this would be imperfect. The refuse water from the bath tubs, wash basins and water closets on each floor is carried by waste pipes directly into this soil pipe adjacent, which runs from the top to the basement. As it is necessary to carry hot water into the attic tank, and as it runs up in a pipe near the soil pipe and is crossed by the hot water offsets from the tank supply under each wash bowl and close to each water closet, heat and moisture are constantly maintained. We found the closet by the wash bowl a heated chamber, and in July could not bear the hand upon the small pipe close to the water closet and the main soil pipe.

WATER CLOSETS.

These are on the second and third floors. On the second floor was one for the part until recently used as the old hospital. It had a separate soil pipe carried to the basement. The chamber slops are emptied into these water closets, each on their respective floors.

The baths connect with the water closets, and in some, one trap served for both these and the wash stands. The third floor water closet had but one trap. These water closets empty directly into the soil pipe, which collects the sewage of the building.

The gentleman who has oversight of the heating engine states that he has occasionally found the traps empty, and that he had noticed, as have others, bad odors through the rooms, and especially at the traps.

As the soil pipe in the second story receives the storm water from a roof this might at times syphon the traps.

The soil pipe which carries the general soil and sewage of the

building has no ventilation save such as it gets from the bath tubs, basins, water closets and the storm gutter on the second floor, which at times may act either to syphon smaller tubes or force out stagnant gases.

OUTSIDE CONNECTION OF SEWERS.

The soil pipe come to a main terra cotta drain just outside the building in the rear of the basement, near by it is joined by the hospital pipe before noticed, then there enters a pipe from a kitchen sink but a few feet distant which receives the slops from dish and dining room work for the whole school. These all not far from each other join to empty all the soil pipe and waste sewage from the entire building and much storm water into this terra cotta pipe. About the last of March it was found by the action of the kitchen sink that there was back flow. On taking up the floor an overflow 6 inches deep was baled out from under a room 20 by 20. This overflow was owing to the fact that in the terra cotta sewer at the point where the kitchen annex joined it a brick had fallen or been left at the time of connecting it a few months before. This kitchen sink has no grease trap and no trap of any kind now, although it is said that one was ordered at the time of its construction. It is but a few feet distant from one of the dining rooms, with an open place between them.

These various pipes thus uniting into an 8 inch terra cotta pipe run some 70 feet to a tightly covered brick enclosure of half barrel size into which enters a small pipe from an outside sink for kitchen slops, and also a small pipe from a basement faucet for hand wash. The continuous pipe for carrying on the sewage from this new centre is narrowed to 6 inches. As we opened this small cess pool the current was very slow and fœcal matter was found floating down from the faucet pipe. A test by putting permanganate of potash as a coloring matter in at the faucet showed that sewage, both liquid and solid, coming down one house pipe found its way up another.

The sewer now continues several hundred yards without ventilation from attic to its terminus, except what it might secure from incidental house defects, and empties a water which the analytical chemist finds likely to have passed through pipes

in the ground which are not sufficiently impervious. The 6 inch pipes also receive at a distance below the brick enclosure the sewer from building No. 5 before noticed.

METHOD OF HEATING.

Before last winter the building had depended upon *furnaces* for heat. In December a high pressure steam system of heating was introduced. The discomforts of the low temperature of former years gave place to excessive temperature which was much complained of.

Some claimed that soon after diphtheria made its appearance, and that the health of the Institution had been decreased. If so, it must be attributed to the fact that increased heat added to the risks from organic contaminations. The introduction of heated water-pipes in May for the hot-water tank in the attic, so near to the soil-pipe, would aid decomposition.

The only remaining building is No. 3, as shown upon the ground plan.

On our way to it, it is well to notice the building marked as the "Old House," which had been on the place for a century. It was in a cleanly condition; its cellar dry; had in it a small school room, and play room used by No. 4 family, but no dormitories. It had formerly been to some extent used as a laundry. Its stone wall needed watchfulness lest some incrustations upon it or decay of stone might furnish organic debris, or be the attaching place of unhealthy fungi. It had no water-closets, but an untrapped urinal and a washing trough connecting with the main sewer of No. 3, were not desirable.

The building No. 3, to which we now come, and where the first patient died, after a sojourn in No. 4, is located to the southwest of the main building, as shown on the plan. It accommodates fifty-seven boys, who sleep in the dormitories on the second and third floors. The heating is by stoves.

It is the newest of the buildings, having been erected in 1875.

The ground over which it stands was a little marshy, and had at times some water on it. The surroundings now seem compact and dry, although no special method of outside drainage was adopted. There is a basement, playroom and boys washing place, and under this the excavation is about two feet

deep in all below ground. On this floor, back of the stairs
the entry, is a water-closet much used. Each dormitory has
water-closet in a recess of just room enough for it, and openin
into the middle of the dormitory. These are used at night b
the boys, and were in use by the boy who first sickened, as we
as by the others, before his temporary transfer to No. 4 two week
before his death. The closets have a hopper trap which depend
for flushing on water which pours into it during use. These gav
much trouble, because they would not infrequently stop up, an
had even overflowed. For this reason, quite recently all bu
the basement one had ceased to be used. There were two place
in the basement where a small opening in the floor could b
raised for inspection. The soil-pipe is the same for the thre
and was found to enter the house sewer at a point in th
sub-cellar under the entry-way. This house sewer, besides th
soil sewage, carries also the water from the boys' basement was
room, and the storm water from the roof. The arrangement
thus: The storm water at the northwest corner (A) enters a terr
cotta cemented pipe, passes along it, nearly parallel to th
foundation, to the point (B), where, by a curve joint, it passes o
to (C) and receives the soil-pipe, and then passes on and ou
forming the sewer E, as shown on the ground plan. But at th
point E, where the terra-cotta curves, it has an opening mad
by a Y tile. The fall from this point to where the soil-pip
enters, is one and three-quarter inches in thirty-seven and on
half feet. Beyond the entrance of the soil-pipe the fall does no
increase. At our first visit we found this open Y mouth unde
the building with a little pool of water about it which smelle
badly, and we therefore took a sample for examination. Th
man in charge said he had to bale out sometimes as much a
three barrels; that he did not know for what purpose the Y i
the sewer had been made; he supposed it was closed, and tha
the water which he had taken out was merely water whic
smelled because it had become stagnant. The chemical exam
ination showed a water deriving pollution from various source
and the presence of nitrous acid showed that an active decomp
sition of nitrogenous matter was taking place. On my retur
soon after, the little water had subsided. I had a boy get dow
to see the condition of this Y joint. It was found open an
stenchy. Thus, rain water from the roof, and wash water from th

deep in all below ground. On this floor, back of the stairs
the entry, is a water-closet much used. Each dormitory has
water-closet in a recess of just room enough for it, and openin
into the middle of the dormitory. These are used at night b
the boys, and were in use by the boy who first sickened, as wel
as by the others, before his temporary transfer to No. 4 two week
before his death. The closets have a hopper trap which depend
for flushing on water which pours into it during use. These gav
much trouble, because they would not infrequently stop up, an
had even overflowed. For this reason, quite recently all bu
the basement one had ceased to be used. There were two place
in the basement where a small opening in the floor could b
raised for inspection. The soil-pipe is the same for the thre
and was found to enter the house sewer at a point in th
sub-cellar under the entry-way. This house sewer, besides th
soil sewage, carries also the water from the boys' basement was
room, and the storm water from the roof. The arrangement
thus: The storm water at the northwest corner (A) enters a terr
cotta cemented pipe, passes along it, nearly parallel to th
foundation, to the point (B), where, by a curve joint, it passes o
to (C) and receives the soil-pipe, and then passes on and ou
forming the sewer E, as shown on the ground plan. But at th
point E, where the terra-cotta curves, it has an opening ma
by a Y tile. The fall from this point to where the soil-pi
enters, is one and three-quarter inches in thirty-seven and on
half feet. Beyond the entrance of the soil-pipe the fall does n
increase. At our first visit we found this open Y mouth und
the building with a little pool of water about it which smell
badly, and we therefore took a sample for examination. Th
man in charge said he had to bale out sometimes as much
three barrels; that he did not know for what purpose the Y
the sewer had been made; he supposed it was closed, and th
the water which he had taken out was merely water whic
smelled because it had become stagnant. The chemical exa
ination showed a water deriving pollution from various source
and the presence of nitrous acid showed that an active decomp
sition of nitrogenous matter was taking place. On my retu
soon after, the little water had subsided. I had a boy get do
to see the condition of this Y joint. It was found open a
stenchy. Thus, rain water from the roof, and wash water from t

[redacted]

boys' basins must, with the slight fall, have leakage here. Worse than all, with the defective fall of the sewer, a stoppage of two inches at the entrance of the soil-pipe would send the liquid water-closet matter out at this opening, besides the constant escape of fœcal gases. I felt confident that such stoppage had often taken place, and the next day, on excavating at the point of junction, the sewer was found choked at where the soil-pipe entered. All use of closets was discontinued, and such temporary change made and such disinfectants used as would at least help to suspend so flagrant and exciting cause of disease. On visiting the privy in the rear of this building, used in common by houses No. 3 and 4, discharges were seen of a dysenteric character; some boys were looked up who were about No. 3, and found so unwell as at once to be advised to hospital. We cannot conceive what the original intent of the opening in the sewer alluded to was, except that it had been left as an exit for any surface water which might collect under the building, the fall being deemed enough to carry off the stream without regurgitation. As it was, it not only was an escape hole for sewer gas, but for fœcal and sewer accumulations, and furnished soakage material for all the adjacent soil. It could go down only five feet deeper on account of the impervious clay, and so must spread laterally all the sooner.

WATER SUPPLY.

Our attention must now turn to the water supply. Already we have found that No. 1 and No. 2 buildings are supplied by wells of their own. These are under the buildings and seemed to the senses to be in good condition.

No. 5, No. 4 and No. 3 by way of No. 4, derive all their faucet water supply from two tanks situated in the ground several hundred yards from the buildings. The water from these is mostly intended for other than drinking purposes, but being easily accessible, is often used by the boys. The water in these tanks seems clean, although in one of them having a doubtful odor. Both of these tanks are to be regarded as shallow surface wells, safe perhaps under the most careful watching, or so long as a surrounding soil, free from organic matter or domiciliary sources of decay, and of good percolating capacity, was able to filter it.

Our chemical examinations were made with great care by Prof. P. Townsend Austen, Ph. D., of Rutgers College, New Brunswick, but it did not extend to quantitative analysis. Several specimens were sent at three different times, and in some cases as with the tank, duplicate specimens. Both tanks were each time reported as surface wells without organic matter. The amount of chlorine and nitric acid found were spoken of as danger signals, but it would require a quantitative estimation to positively state them as dangerous.

The water is conveyed from one or the other of these tanks as may be desired, (one only having lately been in use,) through a common main made of close jointed iron pipe of an average depth of four to five feet, the water being drawn by the exhaust or suction of a steam engine, and being distributed by an offset pipe to No. 5, by a main to No. 4, and through it to No. 3.

Prof. Austen also made examinations twice of water from the kitchen faucet of No. 4, which came from the tank water.

The report on this was not so favorable as upon the source from which it came.

"The large amount of chlorine and absence of lime point to infiltration of sewage. View strengthened by presence of considerable nitrates. Presence of nitrates show water to be decidedly dangerous. May be a surface well or rain water impregnated with sewage."

The difference might be accounted for by some defect in the iron pipe, or its joints, or by reason of thinness. The sewer pipes also necessarily come near this iron water main here and there in its course.

Also as the supply is through the cistern in the attic where the water might absorb foul gases, or where the soil pipe, which serves as the overflow pipe, ends, and might have its water-trap imperfect, it is quite possible that somehow the water might be contaminated in coming from its storage.

The water from these outside tanks or reservoirs was not used as drinking water much in either No. 4 or No. 3, and probably not at all by the first boy that died.

The main supply of drinking water for all the boys of No. 4 and No. 3 was derived from a well known as the Chain Pump Well. It is situated, as shown upon the ground plan (marked

F) in the vicinity of buildings and about one hundred and fifteen feet from the corner of building No. 3.

This water was preferred and exclusively used by all the officers and their families in the adjacent buildings, and by the boys of No. 3 almost exclusively, and much by those of No. 4, as most of these had occasion to pass it. The well itself is well covered and an enclosed chain pump raises the water.

Its depth is seventeen feet or *about eleven feet below the level of the sub-cellar of No. 3 with the natural drainage, aided by the old house cellar in that direction.* Here the clay bed is about twelve feet from the surface, so that cesspool drainage from the sub-cellar of No. 3 where the open soil pipe was found, would have a fall of six feet to bring it to the surface of the water which was about thirteen feet from the top of the well at our first visit.

The following is the report of Professor Austen thereupon, the water having been procured August 20th, 1878:

"(118.) Water turbid; chlorine large; nitrites, absent; nitrates, large; lime, large; sulphuric acid trace; carbonic acid present; organic matter, large; ammonia absent; (?) regular well water; lime present as bicarbonate; results of past infiltration probable. The amount of organic matter is large and renders the water totally unfit for drinking purposes. It would be interesting to examine the well about a month later." About the same time A. E. McLain, a chemist of New York city, examined this and other wells. His note reads thus: "Chain pump is similar to that marked family well No. 1, but contains more organic matter. *All of them* contain ammonia, nitrates, organic matter apparently of animal origin and an abnormal quantity of chloride of sodium."

We now restate the problem to be solved with some of the most important conditions bearing upon it plainly before us.

The outbreak is plainly that of enteric fever. All efforts to trace it to an outside source have failed and made it quite positively probable that the causes were to be sought within the confines of the institution. The history of those first attacked, an examination of sewerage systems and water supply, and a comparison of the buildings with each other in the marked difference in their arrangements as to heating, sewerage, inside conservancy, water supply and modes of distribution, associated No. 3 and 4 and 5 together. No. 5 as being less used as a dormitory,

as having but one water closet, not now in use, as having its outside closet arrangements with No. 2, and not so in proximity with the common drinking supply of No. 3 and 4, seemed after careful allowance was made for some defects, not to be prominently be-before us as the fount and origin of the malady.

With the facts as to No. 4 and No. 3 as already stated, we have this hypothesis before us:

A boy of the Family of No. 3 is taken sick. He had used an inside privy now known to have been clogged and been in a building in which excremental and other matters were escaping through an open tile as fully described. Foul air from this source and from the stagnant water thereof could not but permeate this building. We are first in such cases, says Buchanan, to look for conditions under which air contaminated by excremental products could be conveyed. The conditions found in No. 3 would of themselves be fully adequate to the furnishing of excremental or other enteric matter through the air of the playroom, the washroom or the water closets. But besides this the well of water within one hundred and fifteen feet of the corner in which the liquid discharge had made a cesspool, and where the soil was saturated with sewer contents, is found to contain organic matter probably of animal origin.

While for a time at this distance it was possible for the intervening soil to cleanse the soakage, yet with this oft recurring fœcal and waste cesspool beneath No. 3, at the corner toward the well and several feet below the ground level, and with an impervious clay subsoil, it was quite possible for the water to be contaminated as well as the air of the building.

The boys who fell sick within a week after the death of the first boy, were mostly those of Nos. 3 and 4. These were using the outside privy, to which the first boy went daily, and into which his discharges were thrown until the time of his death. A source of infection was easily multiplied in this way.

There were sufficient ill conditions as to sewerage arrangements in building No. 4 to account for the presence of sewer air in that building, but no one condition was so flagrant as that of No 3, and none so likely to furnish the specific poison of enteric fever as either the air of No. 3, the excretions of the outside privy of No. 3, or the well water of the chain pump.

The boy who was temporarily detained for several days in the

small attic room of No. 4, we believe had contracted his fever before his transfer there. His closer confinement within doors, the air of the attic and his more restricted diet would incline the the disease to intensify.

When first seen by the medical attendant he was probably in the second week of the disease, and died in ten or twelve days. He had, however, been returned to his room in No. 3, so soon as he was found sick enough to need constant care.

The only confusion in assigning the origin of the outbreak arises from the fact that in No. 3 and in No. 4 so much in construction could be found objectionable.

Yet we believe we are to look to No. 3 with its cesspool beneath the building, fouling the air, with a well contaminated therefrom, and with a boy whose discharges were a constant exposure to the boys of Nos. 3 and 4, for the earlier cases.

It is of comparatively little importance whether the contaminated air, the contaminated water or the changing discharges spread the disease since, for the well we can find no possible cause for pollution, save that which was to be found under building No. 3.

In all other respects save that of exposure to sewer contamination, the care for the pupils was so good and the ability to nurse them so available, and the medical treatment so characterized by singleness of purpose and expectant treatment, that we are to attribute to these, as well as to the mild type of over half the cases, the low rate of mortality.

From August 16th, when there were twenty-six in hospital, up to about September 4th, new cases were occurring every day, until over seventy were down. Some changes were made at each visit, but it was not until the condition of sewers had been fully discovered and the water supplies had been tested, that efficient correction, for the time being, was thoroughly instituted. This was completed about the 23d of the month.

Two weeks from that time, or about September 4th, there was a sudden cessation of new cases, in a most satisfactory manner. The infective cause had ceased to operate, and only those before impregnated suffered.

On our visit October 26th we found three convalescents from the fever still in hospital, all of them having been there over six weeks.

We have occasion for great gratitude that an infection so clear in its character, so potent for evil, so extended in its influence should have been limited even though it cost so much of care and anxiety and so much addition to the usual expense of administration.

But it will not be a useless lesson if only it shall lead to a careful study of the whole subject of manufactured disease and a proper recognition on the part of our authorities of the great importance of skilled construction.

No institution in the State, so far as we know, can boast of better discipline, housekeeping or management. Yet it had errors as to its "conveniences" so terrible that we may almost welcome the trial which has exposed to us the fearful possibilities of greater mortality which impended.

Not only other public institutions, but country and city houses and whole sections of some of our closely populated districts have errors of a similar kind which are constantly causing mild forms of sickness and which by an unfortuitous combination of circumstances may easily give rise to a pestilence which will walk in darkness and to a destruction which will waste at noon day. Our ability to detect, prevent or remedy the causes of disease is now such that very many things once hypothetical are raised from the sphere of the probable or experimental to that of the known and actual. Reliance cannot be placed alone upon the plans of architects and the skill of mechanics, or the general opinion of a physician. There must also be the addition of expert sanitary inspection. The mason cannot be the carpenter and the carpenter cannot be the plumber, although each may have some general knowledge in the department of his co-worker. So the sanitary requirements in all structural appointments is a department by itself and must form a part of the superintendance in construction.

This establishment furnishes an illustration of how much faulty, unsanitary work can be done by mechanics of ordinary repute, and how an institution admirably organized and kept with most sedulous care and presenting the most tidy attractions, can yet have in underground sewers and cesspools, in house traps and closets, in imperfect drainage or water supply, enemies in ambush, casting firebrands, arrows and death.

We desire to testify to the promptness with which the superintendent, trustees and officers of the institution applied remedies for discovered defects and hastened the use of measures to limit the endemic. Yet there are structural changes to be made by which in the future it will be impossible for air or water to become impregnated with sewer air or infective particles.

The State Board of Health gave us at once full authority to make all needed investigation. E. A. Osborne, C. E. of the Board, also visited the school and others who were away from home for August endorsed and urged by letters the most careful examination. We were thus able to co-operate with the trustees, superintendent, physician and other officers in a common interest for a common defence. We doubt not that such corrections and additions of structure will now be executed as will maintain the earlier record of the school for its almost exceptional degree of health and thus continue to render the institution one of the most important and successful charities of our State.

HATTING.

AS AFFECTING THE HEALTH OF OPERATIVES.

BY L. DENNIS, M. D.

---

lt the request of the State Board of Health, of New Jersey, I 're, for some months past, been investigating the sanitary re- ons of the business of hatting.

nquiry reveals the fact that in the U. S. Medical Library, at shington, there is no entire volume in English on this subject. ther in the Astor Library, in New York, nor in the Mercan- Library, in the same city, could anything be found on the lthfulness of trades in general. Which facts would seem to icate the need of an awakening of our individual physicians well as boards of health to a more thorough examination of the hygienic conditions of factory life.

l paper by Dr. J. Addison Freeman, of Orange, on the "Mer- ial Diseases among Hatters," appeared in the published trans- ions for 1860, of the New Jersey State Medical Society, in ich it was stated that more than one hundred cases of this ase had occurred in Orange alone. The symptoms were: welling and ulceration of the gums, loosening of the teeth, r of the breath, abnormal flow of saliva, tremors of the er extremities, or a shaking palsy and frequently some- ile action." These cases recovered under the usual remedies mercurial salivation, especially iodide of potassium, or with- any treatment if the work was abandoned for a time. This ase occurred exclusively among the hat finishers, and the ence of mercury having been established by chemical tests he hat bodies before going through the process of finishing, eemed clear that the hot iron volatilized the mercury, and close, ill-ventilated rooms favored the absorption of it in the em, and so the workmen were poisoned. The greater preva- e than usual, of the disease at that time, was found to be due he use of a larger amount of mercury in order to render poor-

materials fit to work up into hats. The author suggested, therefore, that better material be used in the manufacture in order to admit of the diminution of the amount of mercury, and that the finishing room be large and well ventilated.

Some time after, a committee, of which Dr. S. Wickes, of Orange, was chairman, reported to the Essex County Medical Society substantially the same facts as those mentioned in Dr. Freeman's paper, and, after adding that most of the stock is imported, close their report as follows:

"The committee deem this a proper subject to bring to the notice of the State Society. In the eastern section of the State there is a very large number of this class of operatives, and they have a claim upon us as conservators of the public health, to do what we can in their behalf. The facts in the case should be brought to the knowledge of our representatives in Congress, that such prohibitory laws may be enacted, as shall secure the importation of proper and healthy materials. It may be proper to add that the importers have been appealed to by those interested in the hat manufacture, who declare that they cannot control or remedy the evil."

These two reports constitute all the available literature on the subject at our command. The dangers to workmen which they suggest as liable at any time to occur, and the fact that individual cases of the disease above mentioned come to the notice of the profession more or less frequently, prompted a more detailed examination into the whole business. To this end the wholesale dealers in furs, Messrs. White, 63 Broadway, and Hitchcock, Dermody & Co., 91 Mercer street, New York, were visited; also the factory of the latter firm on Park avenue, between Walworth and Sanford streets, Brooklyn, N. Y,, in which are employed about two hundred hands, then in full operation.

The factory of Messrs. White is situated in Danbury, Conn, and employs about seventy-five hands.

The following hatting establishments in Newark and vicinity, were also visited and inspected carefully:

NAME.	LOCATION.	NUMBER HANDS.
V. Hermann	42 Hunterdon street	42
Fairchild & McGowan	Market and Congress	125
R. & A. Fulcher	New and Hoyt	35

NAME.	LOCATION.	NUMBER HANDS.
G. Graah	227 N. J. R. R. avenue	23
E. Sealy, Jr	119 N. J. R. R. avenue	29
J. Schumann	457 Court	39
C. F. Seitz	31 Ward	127
C. Crossley	10 Front	134
Brown & Hyde	Kinney and McWhorter	53
Tichenor & Klein	N. J. R. R. avenue and Green	56
W. Carrolton	61 Lock	63
Hoefler & Hoepner	25 Exchange alley	27
T. R. Austin	157 Summitt	28
Roth & Rummell	McWhorter	73
J. Mercy & Co	Market and Union	87
Mason	First street	26
E. K. Carley	144 Canal	59
Nichols & Mason	233 Central avenue	53
Yates, Wharton & Co	142 Commerce	260
C. B. Alston & Co	39 Liberty	40
E. A. Dodd	Jersey street	32
Stern & Co	1 Commercial wharf	11
Wheaton's	N. J. R. R. avenue and Market	17
Messrs. Gill	Orange, N. J	85
M. Mercy	22 Scott	65
		1589

In this work I have to acknowledge with thanks the very kind assistance rendered in making up the lists of the workmen, in some cases by the proprietors, and in others by the book-keepers, at the establishments of Messrs. Graah, Sealy, Tichenor & Klein, Carrolton, Mason, Yates & Wharton, Dodd, and Stern. The lists of the remaining factories were made mainly by Mr. E. P. Roberts, of Elizabeth, N. J., a graduate of the Stevens' Institute, Hoboken. The latter gentleman also prepared, at my suggestion, the appended summary:

In order to make clearer the nature of the dangers to which the operatives are exposed in this business a brief description is herewith subjoined of each process in the manufacture from the crude fur to the finished hat. Ordinary felt hats are the only ones studied.

"The furs most largely used for the manufacture of hats are those of the hare, coney and rabbit, all of them rodent quadrupeds belonging to the genus *lepus*, and differing mainly in size and the quality of their fur. The hare is the largest of the family and its fur is the finest. Great quantities of the skins of these animals are brought from England and France, where the breeding of them for market is a regularly established business of considerable magnitude. The English rabbit has been domesticated in Australia, and for a few years past the importations from that country have been large and increasing. Many hare skins come from Russia, the fur being a longer staple than the English, but not as fine. Wild rabbits are found in large numbers in our Middle and Southern States, and their fur is extensively used, though hardly equal in quality to the best from Europe.

"For the finer grades of felt hats, and more especially for fur caps, nutria and beaver furnish the choicest material. They are both amphibious rodents, closely resembling each other in general appearance, the principal difference being that the former has a round tail and the latter a broad, flat one. The nutria is a native of South America, and is very prolific along the rivers of the Argentine Republic. The beaver is at home in colder climates and flourishes in our Northern and Western States."

The preparation of the fur for hatting is termed "carroting" and the chemicals are called "carrot" from the fact that their action on the hair colors it yellow like the vegetable of the same name. A mixture is made consisting of 1 pound of quicksilver, 3 pounds of nitric acid and 13 pounds of water, this is stirred with heat until the quicksilver is entirely dissolved thus forming a strong solution of nitrate of mercury. This, with the aid of a short wisp brush, the hands of the workmen being protected by rubber gloves, is thoroughly rubbed into the hair, the skin being held firmly on an inclined plane and the hair brushed both with the grain and against it so that each hair, for about two-thirds of its length, is thoroughly wet with the solution.

These skins when dried in a well ventilated and heated room upon racks prepared for the purpose, are then sent to the brushing room, where each one is held upon a large rapidly revolving horizontal cylinderical brush, until the fur, matted down by the "carrot," is perfectly smoothed, freed from dust, loose hair and the adhesive particles of dried nitrate of mercury. They are

then sent to the cutting room. "The machines which shave the fur from the skins are fitted with sharp, swiftly revolving knives, which remove the fur in an entire sheet, the skin being reduced to shreds. Then follows sorting of the fur into several grades, and packing in five pound bundles." The small fragments of the skins which are torn off in the process of scouring, together with clippings purchased from furriers are carefully sorted, the larger pieces and those having longer and more valuable fur are laid aside to be cut by hand.

"The remainder of the furriers' scraps and all the clippings from the skins used in the factory, are put into a cylindrical machine, and indiscriminately mixed by means of revolving skeleton wheels. They are then spread upon endless aprons, and are thus carried into the mouths of the cutting machines. These machines have teeth something like the ordinary threshing machines. The skins are cut into small square bits, and the fur is removed after the manner of grain from the stalks. This hodge-podge of hide and fur is then screened. After passing from one machine to another the fur is entirely removed from the particles of the skins, is thoroughly cleansed by the process, and is ready for the packers. This is called short fur, and looks like thistle-down."

It is sold to the hatters at a lower price, to be used with the more expensive stock as "filling in" material.

This process of "carroting" the fur is evidently the one in which there is greatest liability to mercurial poisoning by reason of the concentration of that mineral in the wash employed. To guard against this and also against the corrosive action of the solution, the hands of the workmen are protected, as stated above, by rubber gloves. In the establishment of Messrs. Hitchcock, Dermody & Co., the workman longest at this branch of the business had only been employed about six years. He stated that he had never had the tremors but had suffered some from sore mouth and gums, and thought his teeth were beginning to be affected.

One of the Messrs. White stated that they have a number of old men in their factory, some of whom have at various times had the "shakes" and sore mouth, but that of late years there has been no complaint of these troubles since giving the workmen an abundant supply of fresh air.

He also stated that the demand for an increase of "carrot" in the stock has arisen within the past few years. The competition is so close and the margin of profit so small in the hat manufacture that employers are calling for a stock that will felt rapidly and thus materially reduce the time and expense of production. He stated that the process of "carroting" with mercury is a French discovery and was called "*le secret*," all knowledge of its use being for a time kept from other nations, and it being given out that only acids were employed for that purpose. Hence for years in the shops of Great Britain "carroting" was done with a mixture of one pint of nitric acid and four parts of vinegar, and the felting was aided by mixing with fur a certain proportion of Saxony and Spanish lambs' wool. Consequently the workmen were entirely free from mercurial diseases.

A microscopic examination of various specimens of fur which, by the kindness of Prof. C. F. Eickhom, of Newark, were made with his instument magnifying about eight hundred and fifty diameters, revealed the fact that the action of the nitrate of mercury on the hair was to roughen its edges and deepen the natural depressions which exist on its surface, evidently thus favoring the adhesion and entanglements of the parts composing the felted mass. It will be readily understood from this why a fur of short fibre, or inferior quality, should need a greater amount of the "carrot" to cause it to work up satisfactorily, and why workmen are thereby more quickly poisoned. In some instances all the hands in a shop have, in a few days, been either rendered unfit for work or their health seriously impaired by handling stock so treated, compelling the employers to return it to the dealers as unfit for use. Just what, in a chemical way, is wrought by the "carrot," could not be satisfactorily determined in the time at my disposal. Some suppose the whole effect of the drug to consist in its dissolving from the fur the oily and other animal matters which coat its surface, and so prevent the felting. It is a matter of such importance, however, that he who should discover the exact nature of the change produced in the fibre of the fur, and be able to suggest some agent less harmful than nitrate of mercury for the accomplishment of the same work, would certainly be saving hundreds of workmen from much suffering, and very many from the permature wasting of their powers and possibly early death. We heartily com-

mend the subject to the consideration of sanitarians, chemists and microscopists throughout the country.

The fur prepared, as above described, is now mixed by weight and shaken together by hand in various proportions, according to the quality of the hat to be made, from one-half to one-eighth part being a coarse, poor material called "shoddy," composed of short and inferior furs, trimmings of hat brims, &c., which is worked in with the finer qualities to save expense. This material is then passed through a machine called a mixer, in which the fur is passed between a pair of rolls and immediately seized by a cylinder, studded with wires, called a "picker," making eighteen hundred revolutions a minute, by which it is whirled to the top of an enclosing box. It then falls upon an apron and is passed through another set of rolls and over another "picker," by which the several kinds of fur are uniformly and properly mixed.

The same work is done in other factories by an instrument called a "devil," consisting of a cone set with spikes and revolving very rapidly in a case also set with spikes. A set of projecting flanges at the base of the cone produce a strong draught over its surface and the fur fed in an opening of the case near the top of the cone is by this current drawn between the whirling spikes and sent flying in a cloud in a close room which acts as a receiver. Here, as in the other machine, all grades are perfectly blended. After mixing, the fur is placed in a machine called a "blower," somewhat similar in construction to the mixer, but having sets of four to six pickers. Just underneath each one and leading from it to an endless apron is a grating, so inclined as to catch bits of matted fur and pieces of skin with fur attached, called "dags," also all the heavy, long and coarse hairs as by their weight they fall down from the revolving picker, which throws the fur to the top of a grated box, whence it falls upon an apron and is carried forward to another picker, and so on through the set, emerging from the last a delicate fleecy mass, winnowed entirely free from dust, dirt, hair and "dags." The "dags" are collected upon an apron and sent back to be again put through the machine, and at last are collected to be cut and torn for poorer material. The hair and other impurities are collected in a box underneath the machine and thrown away. In this department the air is constantly charged

with dust, so dense and heavy that everything is viewed through a cloud; and a stay of but a few minutes in the room produces in one unaccustomed to it a sense of dryness and unpleasant tingling in the nasal passages, with discharge of mucous which lasts for several hours after leaving the building. Even the next day, sixteen hours after spending about forty-five minutes in the room, the mucous discharged from the nose was discolored with the same dust as on the previous day on just leaving the factory. Showing that it had penetrated very deeply between the folds of the nasal mucous membrane. Some of the hands wear a thin cloth over the nose and mouth while at work feeding the machines and receiving the fur from them; others use no precautions. Boys are mainly employed in this work, but some men were found who had been so engaged for ten to twenty years. Some complain of catarrh, bronchitis, chronic coughs, spitting of blood and loss of flesh. Of thirty-nine hands, five are more or less affected. The dust is also loaded more or less with finely divided particles of nitrate of mercury from the "carroted" stocks.—hence some have suffered from sore mouth and tremors. Of the thirty-nine workmen, eight cases of these diseases were found.

This dust seems less injurious to the bronchial surfaces than that from metals and minerals, perhaps partly from the fact that it is chiefly of an animal nature and thus more readily softened by contact with the secretions of the mucous surfaces and so loses part of its irritating properties and being lighter than the mucous floats on the surface and so is easily expectorated.

Another reason for this difference is suggested by an English writer thus:—"Dust of every kind irritates, but not in an equal degree. Much I conceive depends on the size and figure of the particles which enter the air tube. The dust from the roads produces no apparent mischief, while the mason's chippings from the stone occasions serious and often fatal injury to his lungs. The dust from old iron, which is thrown off so copiously as to deposit a thick brown layer on the dress of the dealers in this article, produces no inconvenience; while the less apparent detachment of particles by the file is decidedly baneful to the workers in iron. It is then the form rather than the material, the spicular, the angular, or pointed figure of the particles detached, which we conceive the chief cause of injury. The

bronchial membrane is mechanically irritated or wounded, and from daily repetitions of this injury the lungs at length become seriously diseased, and a vast majority die consumptive." In very few of the shops visited is any effort made to get rid of this dust. In some establishments ventilators have been put in the ceilings of the blowing rooms, and one manufacturer stated that he had heard much less complaint of sore mouth since that change.

Without doubt, at a trifling expense, with the aid of a fan connected with the main shaft, a gentle current of air could be introduced at various points into these rooms, in warm weather from without, and in cold weather heated by a steam coil so as to make it comfortable for the workmen, and this being allowed to pass out at the upper part of the room would not only perfectly ventilate it, but carry off the greater part of the fine dust which now fills the room. If in addition to this the workmen were protected by close fitting respirators of cotton wool, such as are recommended by Professor Faraday, the greater part of the evil would be remedied.

The fur is next weighed out into parcels of from two and a half to five ounces, according to the size and quality of the hats to be made. Each is then spread separately upon the apron of a feeding machine supplied with a revolving cylinder similar to a "picker," by which it is thrown forward upon another large roller also studded with wire, which projects it forward and upward toward a large inverted cone, in the gill machine, open at the top, into which it is drawn by the action of a fan from the bottom. In the lower part of this open cone, upon a revolving pedestal is placed a perforated copper cone upright, between two and three feet in height, from whose interior the air is exhausted by the fan above mentioned. This latter cone being moistened and set in its place, and the door of the outer, enveloping, inverted cone being closed, the fan draws all the enclosed air immediately toward the copper cone and with it the fine spray of fur admitted to the top from the feeding machine. This fur by the revolution of the copper cone is then deposited in a uniform delicate thin film upon its surface. When the required amount previously weighed out has been laid on the cone it is covered with a conical cloth, sides and top, over which a metallic cover is placed and the whole removed to be immersed for a few seconds in a hot

water bath to contract and compact the material. The covers being removed, the cone is inverted and the felt gently loosened, stripped off and laid aside for further manipulation. In the Burr machine the copper cone is fed through an open funnel, the fur being blown by a fan and suction made on the inside of the cone, as in the Gill machine.

The hat now consists of an immense open bag, which when flattened out, measures from eighteen inches in breadth at the bottom by twenty-four in length for the smaller sizes, to thirty by forty for the larger. It is first subjected to a process called "hardening," which consists of gently rolling and pressing it in a cloth from side to side and end to end, so as to interlace the fibres of the fur more compactly. At the same time it is examined closely within and without, and if there are any thin spots they are patched with bits of fur with the aid of a brush, so as to make the body of uniform thickness. The hands in this department are called "weighers," "feeders," "coners," "wetters," and "hardeners." The first two are handling only the dry stock; the last three the wet stock. The "coners" and "wetters" have their hands moistened constantly with water in which there must be considerable nitrate of mercury in solution. Hence fourteen out of seventy-four workmen, about 25 per cent., have had some form of mercurial diseases. The "hardeners" hold the damp hats on the arms bared to the elbow, in order the more closely to inspect them by letting the light shine through, and so have a larger absorbent surface exposed to the action of the nitrate. Consequently out of thirty-nine men examined, 25 or over 60 per cent., are found to have had some form of mercurial disease.

Among these men inquiry revealed another class of ailments, evidently due to the same cause, namely, a wasting or diminution in size, not very marked but still noticeable, of the muscles, particularly of the arms from the elbows to the wrists; and this, notwithstanding these muscles were in constant exercise and so ought to be expected to increase in size and strength. In one case, besides the general shrinkage, there was a distinct depression between the muscles of the left forearm, so deep that an ordinary lead pencil would lie in the furrow. This man had been working thirteen years at hardening. He complained of impaired memory, lack of power of concentration of his thoughts,

had tremors and general muscular weakness; had not used stimulants for the last eight or nine years. Two others working thirteen and fourteen years respectively, have the same mental symptoms, also increasing physical weakness and diminished size of muscles, though not so marked as in the first instance. Of the nine "hardeners" examined with reference to this in three shops, six were more or less affected, and one of those exempt had only worked in that department sixteen months. In view of this condition and the special dangers in this department our manufacturers should be cautioned against attempting to work up poor materials at the risk of the health of their workmen. The mischief is evidently at the present time not due to imported stock, but to the effort on the part of our manufacturers to supply the market cheaply.

The conical bag above mentioned is now put into the hands of the "sizer" or "maker," who reduces its dimensions to that of an ordinary hat, by rolling it in a cloth and rubbing it back and forth with others on an inclined plank. Four to eight men work about one kettle of water, kept boiling by means of a steam jet. This water is acidulated with sulphuric acid, the action of this being to make the material felt more rapidly. Frequently the fingers are made sore at the edges of the nails, and occasionally when the acid is used in too large quantity the nails are eaten badly by it, and the fingers rendered very sore. These men are in a steam bath constantly, and in the Winter time this is so dense that it is impossible to see more than a few feet in any direction in the room. The frequent dipping of the hats in the kettle and the splashing and slapping of them on the planks splatters the water over the bodies of the men, so that they are most of the time wet. Hence in some cases rheumatic diseases are found among them. About 3 per cent. of the workmen examined report this disease contracted in this room. Only two cases, however, of mercurial disease of the whole number examined who had ever been "makers," probably amounting to four hundred and fifty, ascribe its origin to this department. The comparative exemption of this class from disease is probably due to several causes. The rooms are, as a rule, better ventilated than any others in the factories. For while there is a very small average air space to each man, as shown upon the appended table, yet the lattice work in the upper part of the rooms, with

which nearly all are supplied, is kept constantly open and so furnishes an abundance of fresh air. The work is vigorous and of itself would tend to develop strong active bodies. It is possible, even probable, that the addition of the sulphuric acid and the supply of an abundance of water effect decompositions and recompositions of the salts of mercury, producing several less readily soluble than the nitrate, and thus less deleterious to the workmen. Time did not permit a more critical and chemical examination of this matter.

As a result of these combined causes there is a much larger proportion of old men here than in most other departments of the business, the average ages being only exceeded by those of the "hardeners," "clippers," "dyers" and "blockers," none of whom have as hard work as the "makers," and would, therefore, naturally draw the older men to join them. Then, too, in past times it was customary for apprentices to learn several branches of the business, and as the finishers became incapacitated by age and disease from doing that work, they took position in the making room. In examining the men at work, one would infer in this room the existence of a better state of health than in most others, from the exuberance of spirits manifested. In many cases there was singing and laughing—in nearly all, loud, good-natured, hilarious talking, which was in marked contrast with the quiet of some of the other rooms.

After being sized properly the hats are sent to a drying room, heated to a temperature of 160° to 170° Fahrenheit, whence they go through the hands of a workman who dips them in a solution of shellac, either the brim alone or the whole hat, according to the final finish desired, whether a stiff brim and soft crown or an entirely stiff hat. They are then passed between a pair of rollers to press out any superfluous shellac, when they are ready for a second "sizing." This consists in passing them between a pair of rollers on the surface of which are prominent raised disks, inclined at such an angle to the surface of the roller as to give, when in revolution, a wavy back and forth motion. A number of the hats are rolled in a cloth so as to form a long bundle, which is then thrown in the midst of a set of four rollers of the above pattern, which turn it rapidly about, the disks giving a wavy motion to the surface of the rolls, and thus the size of the hats is still further diminished. They

are now taken to the blockers to receive the first stretching into a shape resembling a hat. Here one machine rounds out the crown somewhat, another pulls it over a cylindrical-shaped block, and at the same time seizes the brim, turns it up and stretches it into shape. It is now ready for the dyer.

Ordinary black hats are produced by successive baths, composed of logwood, copperas and verdigris. In the production of brown, blue, &c., the aniline dyes, bicromate of potash, many varieties of woods and various other substances are used by different manufacturers, some of which are irritating to the hands of the workmen if they have sores upon them. Inquiry failed to discern any specially deleterious effect from these processes, though many workmen, and some employers, were found who believe the "shakes" and sore mouth are due chiefly to impurities in the dyes. After dyeing and drying the hat is again blocked more thoroughly, when, after another drying, it is ready for "pouncing." After leaving the "makers," the processes of drying, stiffening, clipping, dyeing and blocking, seem to be comparatively free from disease. Only two cases of mercurial disease in the whole number of workmen examined refer their origin to either of these processes.

"Pouncing" consists in rubbing off, with the aid of a block of wood covered with a piece of emery paper, all the coarse, rough hairs, which in the process of felting the hat have gradually worked outward and are bristling from all parts of the surface. Formerly this was done by hand entirely and the air of the rooms in which the men worked was filled with dust; the floor, walls and ceiling were loaded with it. This dust was composed of particles of hair and fur, the "carrot" in the stock and all the chemicals used in the process of dyeing. A few cases of disease of the respiratory organs and also of mercurial disease are referred therefore to this department. Of late years in most of the shops this work is done in good part by machinery. Rapidly revolving conical rollers covered with emery paper clean the brim and another instrument sweeps over the crown set on a revolving block. Over each machine is placed an open funnel connected with a pipe leading to a larger pipe the air from which is exhaused by a rapidly revolving fan, so that a strong draught is thus made. The dust and hair are rubbed off and swept out of the room at once to the great comfort and benefit of the

workmen. In the manufacture of white hats in the pouncing room, preparations of French chalk or soapstone are rubbed into the body of the hat. No diseases seem to result exclusively from the use of these substances.

Next in order of sequence but first in importance in a sanitary point of view is the process of finishing. This consists, in the case of black hats, in ironing off smoothly with the aid of a little water the whole hat, crown and brim, with a very hot iron and shaping it to a particular pattern, if it be a stiff hat, upon a block or mould of the required dimensions. The workman is bending over the iron with his face but a few inches from his work, and this for the greater part of the working day.

Here there are conditions favorable to the absorption of mercurial vapors, viz., the highest temperature to which the hat has been exposed in the whole process of manufacture, thus permitting the volatilization of the contained salts of mercury, and the position of the workmen favoring the inhalation of the fumes as they rise. Hence of the one hundred and sixty-eight cases of mercurial disease whose origin is traceable one hundred and seven or 63 per cent. are found to have arisen in the finishing department. Of the four hundred and thirty-eight men at present employed in this work eighty-nine either now have or have had in the past some form of mercurial disease. Of that number only four admit that they now have the disease. This is accounted for in several ways. Several furriers who are said to have used large quantities of mercury, in "carroting" the stock, have gone out of the business. At the time these examinations were made during the months of September, October and November, all the windows and doors of the rooms were open, thus giving perfect ventilation and preventing the breathing in of the mercurial vapors. Again the style of finishing black hats has changed materially within a few years, less of what is called "glazed" surface being produced by the iron. The hatter now uses more moisture and developes a soft smooth finish without the gloss. The latter requires more persistent dry ironing and would be likely, therefore, to volatilize more freely the mercury in the fur. It should be remarked in this connection also that for one reason or another many of the workmen examined seemed unaware that they had any disease, whereas a critical questioning would frequently reveal evidences of it.

doubtless supposed they were answering honestly having
to notice slight indications of disorder and so reported
elves well. For example one of the hardeners, above re-
to, suffering from muscular weakness and wasting reported
ie had no "shakes." Yet, on being requested to stretch
is hand there was a distinct tremor observable. Some
disposed to make light of the matter and gave frivolous
vasive answers. Some, no doubt, had a false pride in
l to a confession of ill health. Very few indeed would
that the disease was contracted in their present places of
and were rather disposed to charge it upon some other
These facts being considered it will be readily inferred
he figures in the table appended will understate the num-
f those more or less affected by this class of diseases. In
hat finishing the dangers are much less, because the iron
d but little.
e subsequent operations, viz: trimming, flanging and pack-
ere nearly exempt from all these forms of disease.
e trimmers attach the band, braid and lining to the hat.
are usually young girls. They work crowded in rooms
sadly ill-ventilated, as very little provision seems to be
for this in any of the factories. The average time in the
ess is short, for obvious reasons, many leaving it to enter
married life. Hence, no conclusions are readily deducible
the healthfulness of their work. Like all persons of seden-
ccupations they are rather disposed to look pale, thin and

e flange, or curl, in the brim of the hat is set on the mould
itting on it a bag of hot sand, thus dispensing with the
In this work, therefore, no complaint of disease is made.
acking consists simply in putting the hats in boxes for the
et, and of course involves no greater dangers than the sub-
nt handling and sale of them in the stores.
ention should be called briefly to some significant facts ex-
d in the appended table, and others which were developed
nversation with the employers as well as their men, and not
abulated.
h individual in the factories above mentioned was visited,
ersonal inquiry made as to all the facts in his history re-
to the three classes of diseases specified. The dimensions

of the rooms were taken, and the number of the hands in each. It should be stated that the time at which these inquiries were made was near the end of the busy season, consequently fewer men were found at work than are often engaged. About fifteen hundred were employed, while the capacity of these shops is two thousand to twenty-five hundred hands. The figures representing the number of cubic feet of air space to one person would, therefore, be materially changed if the factories were full. The averages also are much raised by several instances of a few men being at work in very large rooms, *e. g.*, the packing rooms. In addition to what has been said in reference to ventilation in the blowing and pouncing rooms, particular attention should be called to the finishing rooms. Here the air is necessarily charged with poisonous vapors and should be renovated by artificial means. The most that is done in this direction in any shop is the furnishing of a skylight or open funnel with lattice work to permit the free passage outward of the heated air.

No provision is made for forcing into the rooms a current of pure air from without, thus insuring their rapid and perfect ventilation. It will be observed from the table that in this, the most dangerous work, the lowest minimum of air space of all is found, and the average is too low for health. Dr. Parkes estimates that fifteen hundred cubic feet of air per hour are necessary for each individual for healthy respiration. Of course a larger volume still is needful if it be vitiated by poisonous chemical fumes in addition to the carbonic acid gas exhaled in the breath. It will be seen that with an average air space of nine hundred and ninety-six cubic feet to a man, as in these rooms, in order to support healthy respiration alone the entire volume of the air of the rooms should be renewed every forty minutes. That this rate should be much increased when mercurial vapors load the air must be evident. All the manufacturers who have observed the health of their workmen agree in stating that mercurial diseases prevail much more extensively in winter, when the rooms are closed, than at any other time. The inference is clear, therefore, that wherever disease breaks out ventilation is insufficient. Undoubtedly if an arrangement were employed for drawing off the air from the finisher's bench, such as is in successful operation in the pouncing room for carrying away the dust and hair, there would be very little complaint of disease from mercurial

fumes. For so successfully does this little appliance act that the smoke from the pipe of a workman standing before it is drawn gently downwards and swept out of the room. Much more would the fumes from the heated iron just in the mouth of the funnel be safely disposed of.

All degrees of severity of mercurial diseases reported are included in the two classes, from a trifling soreness of the gums and tongue to entire loss of the teeth, and from a slight tremor of the hands and arms to such violent spasmodic jerking of the muscles as to render the patient incapable of feeding himself or carrying a cup of fluid to the mouth without spilling the whole or the greater part of it, the latter being accompanied by great loss of strength and manifest impoverishment of blood.

The column marked "where contracted," represents as far as could be ascertained, in what particular room each class of disease was first developed, taking the whole factory through, and is not confined to the number of workmen at the present in that room. Thus one hundred and seven report having contracted the mercurial diseases in black hat finishing, but a number of those are not now engaged in that work, having gone to other departments, since but eighty-nine now report the disease in that room.

Hence, two sets of figures were necessary, one to represent the present condition of the men, and the other to indicate where, including both past and present, the greatest amount of disease had been developed. A glance at the table shows that rooms 1, 3, 4 and 13 have developed most mercurial diseases; 5, most rheumatism, and 1 and 11 most respiratory diseases. The reasons for these results are evident from the description of the processes carried on in the respective rooms. Assuming that the numbers employed in the past are about the same as at present, in rooms 1, 3, 4 and 13, we have one hundred and fifty-nine cases of mercurial disease to five hundred and ninety workmen, an average of about 27 per cent.

In order to make some estimate of hereditary influences the occupation of the father was ascertained in each case. In the table is given only the number of those whose fathers were hatters. Of this number, twenty-six report having had mercurial disease. About 13 per cent. of those whose parents were not hatters had the disease, whereas only 11 per cent. of those whose

parents were hatters developed it. These figures are insufficient, however, as a basis for any general conclusions.

In conversation with the employers as to the diseases to which their men were subject, in fully three-fourths of the cases the statement was made that the chief cause of ill-health among them was intemperance. Since all writers on the articles used as medicines represent muscular tremors as one of the most common effects of the excessive and long continued use of alcoholic stimulants, it seemed necessary to inquire what proportion of the men were addicted to them, in order to judge, if possible, what influence this might have on the disease. The figures attached to each class represent a condition of things sufficiently deplorable to fully justify the statements of the manufacturers. Again, Dr. Phillips, of England, a careful writer on materia medica, and therapeutics, says of the chronic effects of tobacco: "general nervous depression has frequently been produced, showing itself in restlessness, insomnia and a tremulous condition of the limbs, not very unlike the phenomena of chronic alcoholism." Dr. H. C. Wood, of Philadelphia, says of nicotia in poisonous doses: "in one or two instances violent muscular tremblings have come on shortly after the ingestion of the poison and ended in general clonic convulsions." It is worth considering, therefore, how far the constant and excessive use of this drug may have assisted in the production of this class of diseases.

The data here likewise are insufficient, since the element of time is not taken into the account. Independent of that, however, taking only the classes of work in which the men have had the "shakes," out of twelve hundred and twenty-eight hands there are found—

800	using stimulants and tobacco, with 80 cases of shakes	10	per cent.
106	" " but not tobacco, with 8 cases of shakes	7	"
216	" tobacco, " stimulants, with 20 cases of shakes	9	"
75	" neither, with 8 cases of shakes	10	"

Of the whole number of persons examined, leaving out the weighers, feeders and trimmers, who are girls, and do not, as a rule, use either stimulants or tobacco, there are left twelve hundred and fifty. Of these nine hundred and nineteen, or seventy-three per cent., use stimulants, and one thousand and thirty-five, or eighty-two per cent., use tobacco. Of course very many of them use both to excess, thus wasting hard-earned wages, undermining health, destroying the peace and prosperity of families, and in some cases preparing the way for entrance into our

prisons and poor houses. He who shall succeed in so vividly and truly painting the dangers attending the use of these two articles as to deter healthy men from taking them, will confer a priceless blessing on humanity. Perhaps more is to be looked for from early training than any other agency, and it is incumbent on every sanitarian to urge the necessity of teaching thoroughly in all our public schools and institutions of learning the laws of sound health and right living. It may safely be assumed that one of these fundamental laws would teach that, to the human body in a state of health, both stimulants and tobacco are not only worthless but positively detrimental.

CLASS.	Number.	Average Age.	Average Time Hatting.	DISEASES. Respiratory Organs. Past.	Respiratory Organs. Present.	"Shakes." Past.	"Shakes." Present.	Sore Mouth. Past.	Sore Mouth. Present.	Rheumatism. Past.	Rheumatism. Present.	Where Contracted. Mercurial.	Where Contracted. Rheumatic.	Where Contracted. Respiratory.	Number Using Stimulants.	Number Using Tobacco.	VENTILATION. Number Cubic Feet of Air Space to Each Man. Maximum.	Minimum.	Average.	Number of Fathers Hatters.
1 Mixers and Blowers	39	31	7	...	5	2	2	1	7	...	...	14	...	5	18	30	8983	2580	3846	2
2 Weighers and Feeders	44	21	4	...	...	.....	...	...	3	...	...	3	...	...	.....	.....	4000	1203	2415	4
3 Coners and Wetters	74	36	10	1	...	1	2	11	...	...	...	15	...	1	45	61	4000	1203	2361	4
4 Hardeners	39	38	17	...	...	14	3	8	9	1	...	23	1	...	9	15	4000	1203	2389	4
5 Makers	379	37	20	1	3	16	2	...	1	12	1	2	15	...	337	316	2215	284	869	86
6 Dryers	4	21	1	...	...	.....	...	...	...	...	...	.....	...	...	2	4	9000	3300	6150	.....
7 Stiffeners	11	27	16	...	...	1	...	...	...	...	...	.....	...	...	9	10	7200	825	3313	2
8 Clippers	2	56	30	...	...	.....	...	...	...	...	...	.....	...	...	2	1	572	572	572	.....
9 Dyers	45	38	10	...	...	1	...	...	...	...	...	2	...	...	28	36	8250	366	2654	2
10 Blockers	16	40	21	...	...	.....	...	...	...	1	...	.....	...	...	9	14	2700	925	2050	4
11 Pouncers	118	30	10	2	2	4	...	1	...	...	...	1	...	4	98	100	8400	213	1417	13
12 Finishers, white	48	28	10	...	...	5	1	1	...	...	...	1	...	...	28	42	1400	514	839	9
13 Finishers, black	438	30	14	3	...	54	4	31	...	4	...	107	4	2	310	377	3686	200	986	87
14 Trimmers	223	23	5	...	...	.....	...	...	...	...	...	.....	...	...	.....	.....	1639	261	729	38
15 Flangers	19	37	11	...	...	2	...	...	...	1	...	.....	...	...	13	15	5280	924	3369	5
16 Packers	18	22	11	...	...	2	...	3	...	...	...	.....	...	...	11	14	26400	533	6898	5
Total	1548	32	12	7	10	102	14	56	20	19	1	168	20	12	919	1035	6108	944	2559	285

Springs, Wells and Cisterns as Sources of Drinking Water.

BY PROF. H. B. CORNWALL, E. M.

A good well has always been regarded as a most valuable possession, and no water is more wholesome and palatable than fresh, cold, pure well water. To secure such a well wherever it is possible is an object worthy of much trouble and expense. To secure a good substitute for it when the well cannot be obtained should be no less the aim of every householder.

That good drinking water should be cold, clear, colorless, odorless and free from any taste, beyond the natural taste of fresh, cold, well water, as opposed to *flat*, boiled water for instance, is known to all.

So also it is generally admitted that drinking water should not be too hard, and should contain no poisonous mineral substances, like copper, lead, or arsenic compounds.

Let us review these requirements somewhat in detail:

Water, even in wells in peaty districts, may show a slight brownish tinge, when viewed from above through a depth of twelve or fourteen inches, and may yet not be bad to drink, particularly for people already accustomed to its use. Strangers are, however, liable to suffer from slight diarrhœa when drinking such water.

Drinking water must be odorless. Many well waters are free from odor when fresh and cold, but if kept for a few hours in a clean bottle in a warm place, they show a decided and generally unpleasant odor, on being well shaken. It may be taken as an invariable rule that no such water is thoroughly wholesome; on the contrary, it should always be regarded with suspicion, and never used except with the precautions to be given later. Still more certainly bad is any water which has an unpleasant odor when

fresh from the well. Persistent use of such water will not fail to affect generally the health of those drinking it.

This question of odor is important, as it is one very valuable indication of the character of water. Many seemingly good waters give off a mawkish, unpleasant odor when boiled, in a tea-kettle for example, and they are to be regarded with suspicion.

As regards the taste, it is very desirable that water should be as sparkling and fresh as possible, and every good water will have these qualities, due to the presence of oxygen and carbonic acid gases. Still, many very unwholesome waters have been preferred because they seemed especially fresh and sparkling. The very impurities which had contaminated them had charged them more highly than usual with the carbonic acid, without imparting to them any unpleasant taste or apparent smell.

The taste due to *hardness* of water we will consider separately. This hardness is caused generally by the presence of an undue amount of carbonate, sulphate, nitrate, or chloride of calcium (the metallic basis of lime) and magnesium.

The agreeableness of such waters is a matter of taste or habit, and to habit in a great degree is due their good or ill effects on the system. It is well known that very hard water affects, at least temporarily, the bowels of almost all strangers accustomed to softer drinking water, but although eminent authorities hold opposing views on the subject, the general verdict on the question of hard or soft waters is, that no effect on the health can be certainly traced to the use of the softest waters or of moderately hard water; while very hard waters are universally condemned.

Some waters become soft on boiling, because the carbonic acid gas they contain is in part expelled and the carbonate of lime or magnesia which this gas held in solution is thrown down as an insoluble powder, generally appearing as a light colored coating on the inside of the vessel.

When the hardness is due to sulphates, chlorides or nitrates, boiling does not improve the water. The hardness of water is measured by ascertaining how much solution of soap, of known strength, is required to form a lather with a given quantity of the water. The test depends upon the well known fact that hard water forms with soap an insoluble compound, so long as the soap is not in excess of the mineral matters that decompose

it. The hardness ascertained by this test is reckoned in degrees and as it is assumed that all the hardness is due to lime, it has been agreed in England to call one grain of carbonate of lime in seventy thousand grains of water one degree of hardness. Five degrees of hardness is all that should ordinarily be present, but ten or twelve, or even somewhat more may not be too much, provided the water owes its hardness to carbonates, and so becomes much softer on boiling.

The presence of other metallic salts, like iron salts, in notable quantity, renders water unwholesome through the bad effects on the bowels, while even very small quantities of copper, and more especially of lead, produce specific poisonous effects. No water should be drunk which contains enough iron, lead or copper in solution to cause the slightest dark coloration when the water is slightly acidulated with two or three drops of muriatic acid and then mixed with several drops of sulphuretted hydrogen water, well stirred, and viewed from above through a depth of four or five inches in a glass tube held over white paper. Lead or copper are thus at once detected; iron needs the further addition of a few drops of ammonia water, to give to the whole a smell of ammonia when well shaken up. From one-fifteenth to one-tenth of a grain of lead or copper can be thus detected in 70,000 grains of water, and no water which contains so much should ever be used habitually. Hundreds of cases can be cited of lead poisoning, colic and paralysis due to water. Lead and copper get into water from leaders on roofs, from lead pipe and linings in wells and cisterns, and occasionally copper comes from the soil itself. It is true that well and spring waters generally contain mineral salts which soon form on the pipes an insoluble coating of lead salts, and thus protect the lead from further action, but many well waters contain chloride, nitrates and other salts which rapidly and persistently dissolve the lead, and the same is almost invariably true of rain water. No lead should therefore be allowed to come in contact with any water unless actual experiment has proved that the water soon ceases to attack the lead. So dangerous is the use of lead pipes and linings in rain water drinking cisterns, that it should in all cases be condemned without waiting for a trial, and even in case of well or spring water, the water that has remained standing in the lead pipes over night should never be used. These facts are too well

attested to require further notice here, especially since it is so easy to guard against them. Zinc is less dangerous, but neither zinc, lead nor copper should be used on roofs or any where else where drinking water is collected, nor should rain water or soft spring or well water be conveyed through any considerable length of lead pipe. Tin-lined pipe, well made, is perfectly safe, but much tin-lined pipe is badly put together or not lined with pure tin, and therefore it should not be too implicitly relied upon, unless put up by the most trustworthy persons.

Having now considered the most evident qualities of drinking waters and pointed out the precautions to be taken against the mineral, or organic impurities, we come to a more generally important, because more widely spread and less obvious class of impurities, viz: the organic impurities.

It is these that give to waters their malarial properties, these that aid the spread of typhoid fever, and these that, if not manifestly to blame, may justly be suspected of causing a great deal of troublesome, if slight, feverishness, dyspepsia and general ill health. That this is so will not be a matter of surprise when we consider whence the organic impurities are largely derived.

The organic matter in water comes partly from the air, where it is floating in very fine particles. So much of it is washed down by the rain, especially by the first rain after a long dry season, that the rain water often acquires an offensive odor after standing some time in a warm place. Even after a long continued rain the air still contains slight traces of organic matters. These are of both animal and vegetable origin, but consist mainly of dead matter.

When rain water reaches the surface of the earth it finds abundance of vegetable matter, and from this, especially when the late Autumn has covered the ground with dead and decaying vegetable remains, the water extracts an abundance of soluble compounds very prone to putrify. Just as a decoction of grass put in a bottle in a warm place soon smells bad, so do these vegetable extracts tend to become offensive also. If the ground is strewn with dead animal matter, or with excrementitious matter, these give up soluble compounds in abundance to the water. The roofs of buildings likewise furnish a very considerable quantity of similar impurities.

When the water penetrates into the ground it takes up not

only mineral compounds, but if the soil has been overcharged with vegetable or animal matter before, it also extracts from these a still further quantity of putrefiable and soluble materials.

Upon the quality and quantity of the compounds with which the water is thus charged, its properties will largely depend.

The most injurious of these organic matters are the nitrogenous, or as they are often called, albuminoid compounds. These are prone to change, easily putrefy or ferment, and when in the process of decomposition are without doubt capable of inducing very serious sickness. Thus, severe attacks of diarrhœa and obstinate fevers, generally termed malarial, have been proven to prevail among persons using water contaminated only with vegetable organic matter. Animal organic matter has the same tendency, but when the animal matter is excrementitious, when it comes from house drains, sewers, and the like, it may possess far more dangerous properties. It seems probable, but has scarcely been really proven, that water highly charged with such contamination can originate dysentery and typhoid fever; or at least diseases assuming a very similar type. Even although this be not admitted, hundreds of cases can be cited to prove that water once charged with the discharges of patients suffering from typhoid fever or cholera does produce in other persons these same diseases. Some instances to prove these statements will be cited hereafter.

It appears then that much rain water and all surface water, that is, water that is wide-spread over the surface of the ground, is charged with more or less organic impurities. Fortunately the earth itself has a great purifying power. These nitrogenous, putrefiable matters are rapidly oxidized as the water percolates through clean earth, and this natural filtration under ordinary circumstances entirely changes them into harmless, simpler compounds. The change is effected partly by the oxygen of the air contained in the earth; partly, and perhaps chiefly, by the agency of the minutest living organisms, and the products are harmless nitrates and nitrites.

The great purifying power of earth was tested by the Commissioners on the Pollution of Rivers in England, and the following is quoted from their first Report, *Vol. I, p. 69*: "Our experiments also appear to show that, if the soil be not overdosed with sew-

age, it will retain its efficiency for a long, if not for an unlimited period of time, and its pores will not become clogged up." "The cleansing power of a soil seems to be more closely connected with physical condition, as regards porosity and fineness of division, than with its chemical composition." "The nitrifying or purifying power of a soil is not interfered with by moderate cold." A very porous gravel and a light loam were found most efficient, while a light sand was inferior. It may be added, that compact, clayey soils are also less rapid purifiers of water. The above facts are worthy of careful consideration. The earth must not be overloaded with impurity. The commissioners state that one cubic yard of the most efficient soil could purify 9.9 gallons of ordinary sewage daily, if it drained through a depth of six feet, but this was only the purification which they thought necessary before the sewage should be turned into water courses or rivers, and was only accomplished by an intermittent filtration, allowing air to enter the earth at frequent intervals. When the earth is overloaded it is found that the water actually takes up additional impurities from it.

Moreover, it is generally admitted that while the ordinary organic matter even of sewage may thus be rendered harmless with comparative facility, yet when specific diseases like typhoid and cholera have imparted to water their specific properties, whether these be regarded as germs, as chemical compounds, or as of inexplicable nature, a far more thorough and prolonged action of the earth may fail to render the water harmless.

In a little town in the Canton of Basel the inhabitants were supplied with water from public fountains, which were fed by a hillside spring. This spring was known to communicate underground with a brook three-quarters of a mile away, on the other side of a hill, the soil of which was comparatively loose, being regarded as the moraine of an ancient glacier. A solitary farm house stood near this brook and the farmer, returning from a journey, was seized with typhoid fever. Within two months, at intervals, three others of his family were attacked and toward the close of this time the fever broke out in the little town, which had never had before more than a stray case. Soon 17 per cent. of the inhabitants had been sick, and as a very few who did not use the public fountains escaped, suspicion was directed toward the hillside spring. About a ton of salt was poured into

the brook by the farm house, and its presence was soon shown in the fountains of the infected village. Then about two tons of flour were mixed with water and thrown into the brook, but not a trace of it came through the hill. The poison of the typhoid fever, introduced into the brook with the slops and by washing the clothes at the farm house, found its way through the three miles of earth which effectually removed the finest grains of flour.

This is a remarkable case, but similar ones have occurred elsewhere. A gentleman residing near Princeton brought a sample of his well water for analysis. A colored man had brought typhoid fever with him from a distant place and died; another member of the household died of typhoid soon after, and two others who used the well were attacked. Analysis proved that the well was contaminated with sewage, probably from the house drain; the well was abandoned and the patients recovered. It is needless to recite more examples, but the fact must be remembered that once a water is contaminated with the discharges of persons suffering from certain diseases, it is possible for the water to communicate these diseases after an apparently thorough purification. Nor do these defects show themselves only among the weak; healthy persons are quite as liable to attack.

In Manchester and Salford, England, the cases of cholera were reduced to one-sixteenth by the introduction of pure water.

When these specific causes of disease are absent the impure waters do generally affect the weaker persons more readily, as was the case in one particular family in Princeton, N. J. It seems, too, as if by constant use persons may become less liable to injury from ordinary impure water. In this way an English writer explains the fact that many rural and seaside resorts show no excessive mortality among the regular inhabitants, while the unfortunate summer visitors suffer severely.

By what means can the nature of the impurities in water be ascertained? Analysis cannot determine whether the specific poisons of typhoid or cholera are present; the embryos of parasites may escape the most careful microscopic examination; it is not possible, within certain limits, to say how long a dangerous water will continue to be dangerous; still, analysis very often serves to detect danger where it was hitherto unsuspected, and very often analysis can determine whether the impurity is of

vegetable or animal origin. It may therefore, prove a valuable aid in discovering the cause of sickness.

Organic impurity of a dangerous nature from vegetable matter shows itself in water by the presence of an undue proportion of carbon and nitrogen, or of ammonia nitrates and nitrites, the products of decomposition and oxidation of the organic impurities. If the impurity is of animal origin, and especially if it is sewage, chlorine, and often phosphoric acid, will be also found in excessive proportions.

The larger the proportion of nitrogen to the carbon in any given amount of organic impurity, the more injurious is the impurity ordinarily, for the highly nitrogenous compounds are most prone to putrefaction. Accordingly, a method of determining this proportion has been perfected by Dr. Frankland and it is very reliable, but since it is only to be trusted when executed with utmost care, and since it is very tedious in comparison with other methods, it is generally only adopted when the absence of other known facts renders one of the easier methods inadmissible. If the conditions of the water supply can be carefully studied the process known commonly as Wanklyn's process affords a very expeditious and safe method, worthy of confidence in experienced hands. This method consists in determining the amount of ammonia existing as such in water, and also the amount of ammonia which the water will further yield when boiled with a strongly alkaline solution of permanganate of potash. Taken in connection with the amount of chlorine found in a sample of water, with also the nitrates and nitrites, if necessary, this method gives very reliable results where the conditions of the water supply can be carefully studied, as is almost always the case with wells and cisterns. The nitrates and nitrites may become necessary guides where the organic matter has been quite largely oxidized, especially if the chlorine determination is doubtful in its indications.

Assuming that that the oxidation has not been unusual, the following rules may be taken as guides in the interpretation of a well water by Wanklyn's method. The ammonia already present in the free state or combined with an acid, and called always free ammonia, should not exceed .08 parts per 1,000,000; if it does, especially when an undue amount of chlorine is present, it is almost certainly a sign of recent contamination by animal ex-

creta. The ammonia derived from the nitrogenous compounds by boiling with the permanganate solution is called albuminoid ammonia. It should never exceed .15 parts per 1,000,000, and in combination with much free ammonia even 0.05 to 0.1 parts per 1,000,000 is very suspicious; in presence of much chlorine it is an almost certain indication of sewage contamination.

Chlorine varies in normal quantity according to location. Near the seashore the salt water, containing much chloride of sodium, or common salt, may increase the normal amount of chlorine in well water very largely; but generally there should not be over 1.5 to 2 grains of chlorine per gallon of water in good well water.

Generally speaking, a determination of the free ammonia, albuminoid ammonia and chlorine suffice; the nitrates and nitrites serving as valuable guides in cases of doubt. The nitrates and nitrites may come from vegetable impurities alone, but if they occur with chlorine, in excess of the normal amount, they, too, indicate animal impurities.

Below are given a few examples of well water, good and bad.

NO.	FREE AMMONIA.	ALBUMINOID AMMONIA.	CHLORINE.
1	.016	.036	2.
2	.066	.08	2.5
3	.054	.098	2.7
4	.04	.14	3.6
5	.09	.16	1.6
6	.066	.434	5.05
7	1.36	.28	8.5

No. 1 always has been one of the best wells in Princeton. No. 2 is near a surface drain leading from a stable. It was long suspected and is now abandoned. No. 3 is near several privy vaults, some in use, others abandoned. A strong man using it was severely attacked with typhoid fever. No. 4 is near several old vaults. The owner says it almost always caused diarrhœa among strangers using it. The comparatively small free ammonia accords with the fact that the drainage is not recent. No. 5 shows little chlorine, and this accords with the fact that the impurity is mainly vegetable; the well is shallow and in a field, so that the Autumn rains charged the well with water laden with vegetable matter. The well frequently smells bad in the Fall. No. 6 is the well before referred to as having probably spread

typhoid fever. No. 7 is a well manifestly exceedingly impure from sewage. It is near a privy vault, and naturally those using it suffered constant attacks of sickness, and even of typhoid fever, before it was abandoned.

Cistern water unless collected with care, may be more charged with putrescible organic matter than an exposed well water, and it will be decidedly unwholesome; but when it is so impure, especially in warm weather, it generally acquires a more offensive odor, which prevents its use.

Below are analyses of some cistern waters.

NO.	FREE AMMONIA.	ALBUMINOID AMMONIA.	CHLORINE.
1	.05	.16	.175
2	.52	.16	.2
3	.10	.08	1.
4	.02	.02	.2

No. 1 is a fair ordinary cistern water, after heavy fall rains, and neither very good nor very bad to drink. No. 2 is similar; the large amount of ammonia is doubtless due to the presence of a rusty iron pipe, for iron rusting in rain water evolves considerable ammonia. No. 3 has five times as much chlorine as average rain water—the cistern received drainage from a cesspool, and although it has less albuminoid ammonia than Nos. 1 and 2, the free ammonia and chlorine together show where the trouble lies. The water had a very bad smell. No. 4 is a carefully collected and filtered cistern water. Nothing could be better to drink, and more is to be said about this sample hereafter.

Ordinarily, cistern water may be regarded as better than an equally impure well water, for the chances of animal contamination, and consequently of specific disease, are reduced to a minimum. Still cisterns become very unwholesome, by absorbing foul gas from drains, or by leaks admitting drainage.

Water analysis can hardly be undertaken by the inexperienced. A simple test for chlorine has been given in the first report of the Board of Health of New Jersey, 1877, page 84. Very often a dangerous water can be detected by its odor. If it is kept for a day in a closed bottle, half filled and set in a moderately warm place, it will smell bad on being violently shaken,

or still more certainly if it is then heated nearly to boiling and the smell tested frequently during the heating.

How can good water be secured? By keeping impure rain water and surface water from running directly into the wells, springs, and cisterns; and by preventing sewage and excess of soluble vegetable matter from overloading the earth through which water reaches the wells and springs.

The surface water will be so much purified by draining through a moderate depth of light loam, such as the soil of granite districts, or by a somewhat greater depth of sandy soil with a moderate amount of loam, that under ordinary circumstances, in the sparsely settled country, any well sunk to a depth of twenty-five feet or more is certain to be good. It is only necessary to take care that no broken drains run near it and that no cesspool or privy vault comes nearer than one hundred feet. Such security is possible, however, only where the porous, loamy soil is itself deep.

If a light soil of only a few feet covers a heavy, compact clay, the drainage from the cesspool or vault, especially in rainy weather, may run between the clay and the light soil to an unexpected distance, particularly when the slope of the clay bed favors this course. Under these circumstances a well might be contaminated at a distance much greater than one hundred feet. Careful study of the ground, below as well as above the surface, will aid in determining the relative location of well and drain or vault under such circumstances. A further safeguard consists in sinking the well through the clay into lighter soil below, if possible, or at least in sinking it several feet into the clay and lining it with a wall running nearly to the bottom, so tightly cemented as to exclude all water that has not been forced to pass through the clay also.

A shallow well in light soil covering clay is almost certain to be overloaded at times, with vegetable matter at least. In boggy or marshy land, too, these shallow wells, only ten or fifteen feet deep, are necessarily impure. The water from them will smell bad in summer, and is especially liable to cause malarial troubles. Often a new pump log yields enough soluble matter to make a well very offensive.

Surface water must be excluded from all wells, then, in very sandy or marshy soil, or in light soil underlaid at a depth of a

few feet by heavy clay. Wherever the water supply is abundant enough the *driven well*, consisting of an iron pipe forced into the ground, partly by boring, partly by hammering, serves excellently.

Surface water is perfectly excluded, for the water can only enter a perforated section at the bottom of the tube. In sandy soils these are much to be recommended, for it must be remembered that sandy soil lets impure water pass rapidly through it, and so does not as perfectly purify it as would a somewhat more compact loam. Marsh water is also kept out, if the pipe be sunk deep enough. In case of a light soil, with clay at a few feet below the surface, the pipe should go through the clay into light soil below, if possible. If not it will generally be found that the water supply from a *driven well* will be deficient. Clay soils are not suited to them, and recourse must then be had to the dug well, tightly lined with a cemented wall.

Compact rocks do not generally supply enough water for a well; fissured rocks are decidedly dangerous under some circumstances. If a fissured rock lies a few feet below the surface the cracks in it may act like so many pipes, carrying nearly undiluted drainage to a great distance. A gentleman finding his well, near the house, spoiled by a cess pool, dug another deep well at a distance of seventy-five feet or so from his cess pool, the top of the well being several feet higher than the top of the cess pool. Before the well was finished a little stream of foul water began to trickle into it, having come from the cess pool through cracks in the rock. The rock was the red shale and sand stone of New Jersey, and the general course of one system of cracks lay in the direction between the well and the cess pool. The gentleman wisely abandoned the well and constructed a suitable cistern, furnishing the excellent water before mentioned.

In the country there should be no trouble in getting good water, but the little streams that run through low meadows, and often supply houses with drinking water by means of shallow wells or hydraulic rams, are very liable to be bad.

In more thickly-settled villages and country towns the difficulty is much more serious. If the soil is good, and the drainage thrown into it by means of cess-pools and vaults is well managed and not excessive, there need even here be little trouble; but if the soil is sandy, or if it is sand over clay, or a light soil with rock at little depth, great care will not obviate all

danger, while the gross negligence usually manifested everywhere brings its train of sickness with it. In such towns, not provided with well-built sewers, no water-closet should be allowed; cess-pools for kitchen drainage should be forbidden; privy vaults should not be made receptacles for even the chamber slops, and they should be protected from the entrance of surface water during heavy rains by means of tightly cemented walls. They should also be cleaned out regularly and often.

"Out of sight, out of mind," is the rule. If the householder can only get rid of all this refuse by putting it under ground he is satisfied, not stopping to think what becomes of all the water unnecessarily thrown into the filthy receptacles. It is this excess of water that does the main harm. It must go somewhere, and a well, being a very deep drain, the pressure toward it from all sides is great. The cess-pool, located from convenience or supposed necessity, within fifty feet or less of somebody's well, must contaminate it in time, unless the most favorable conditions exist. A light sandy soil may soon show the bad effects; a clay soil more slowly, but not less surely; a thin soil over clay or rock very certainly. Nor is the danger always manifest. General ill-health exists for a long time; perhaps no one is seriously affected until specific poisons are transmitted through the drains or vaults, and then suddenly an epidemic prevails. In the case of the well water referred to as No. 6 in the previous list of analyses, the water was contaminated at a distance said to be about one hundred and fifty feet; it had been so contaminated in all probability for a long time, but the presence of the typhoid patient first made it peculiarly dangerous. There is no escape from the conclusion that, so long as our present *convenient* systems of water-closets, drains, cess-pools and ill-arranged vaults is allowed, so long danger exists in every well in crowded towns.

If the well water must be used it should be thoroughly boiled; not a drop of unboiled water should be drunk from a well, unless the fact is established, that that well is supplied with pure water.

This is not the place to dwell upon the other sanitary aspects of bad drainage in towns; we have only to consider the water supply.

There exists everywhere, except in large manufacturing places, an abundant source of pure water, the sky. Let several hours

of drenching rain thoroughly cleanse the air, the roofs and leaders; then let the rain water run, from a slate roof if possible, into a cistern kept exclusively for drinking water. In families this cistern should be rather small, so that it can be cleaned at least twice a year, on the approach of a long storm. It should be cemented tight, sunk in the ground, kept well covered, the overflow carefully guarded against access of animals or foul gases, and the light Summer rains should on no account enter it. Then it will always furnish sweet, clear water. In Summer the water will not be cold as well water, but that fault can be remedied by ice. Where this is impossible, large, *unglazed* earthenware vessels, holding six or eight gallons, filled with the water, covered and set in the open air, in as windy a place as possible, but in the shade, will be found to supply cool water freely. The water is cooled by the evaporation of the water that slowly oozes through the unglazed vessels. This is the method almost invariably used in tropical countries, especially where rain falls only during a part of the year and must be stored in large cisterns. It is to be regretted that the custom has not found a place here. The vessels must be scoured occasionally with clean sand and water, and then scalded thoroughly. They could be cheaply procured if there was a demand for them, and they last a long time before the pores become clogged.

Such cistern water will not ordinarily require filtering. If it is desired to filter it, in order to make sure that no parasitic embryos shall be taken into the system, the best filter is a simple glazed earthenware jar, holding five gallons, or even less, having a double bottom. The upper bottom has a small hole closed by a bit of sponge; the space of four inches or so between the two bottoms is packed with clean gravel, above which is fine clean sand; the lower bottom is perforated with very fine holes through which the water slowly passes to an earthenware vessel below, into the top of which the filtering vessel tightly fits. The water is drawn off from the lower vessel by a faucet. If this lower vessel is unglazed it will serve at once as a cooler and reservoir. Such filters and reservoirs are now largely made, except that the reservoir is also glazed, necessitating in Summer, the use of ice, for such filtered water is very flat at first.

An easier and much more thorough way of securing absolute purity in cistern water is to boil the water for half an hour and

then put it into the stone jar, dispensing entirely with the filter. That is the method followed by the writer, using an ordinary cistern. The jar must frequently be scalded. In Summer the water of the ordinary cistern becomes too foul, however, if it has to supply all needs, thus making it necessary to collect all the rain that falls.

These small filters should be cleansed by scalding the sponge weekly, and removing and scalding the sand and gravel at least four times a year, or they may become breeding places of worms, etc. The filter, too, should not be kept full, but a pail of water is to be poured into it and allowed to drain completely off before any more is added. Five gallons a day is as much as the small filters just described can cleanse thoroughly.

Where the drinking water cistern must supply a large number of persons it becomes very troublesome to boil the water, and then it is advisable to place within the cistern a large box-filter of sand and animal charcoal, from which the water is pumped for use. Such filters must be renewed twice a year, to ensure their perfect action; so much of the charcoal, at least, must be replaced by fresh as seems to be most affected by the impurities.

Filters cannot be relied upon to purify a really bad water. The best of them will speedily become so foul that they will render the water even worse. If a bad water must be temporarily used there is no resource but to boil it thoroughly. For domestic use, with already very fair water, the above small sand filter is recommended because it is so readily cleansed, but it is only meant to further purify water already good. No reliance is to be placed upon the statements that this or that filter will last for a year or more. Finally, a well water, ever so slightly contaminated with specific poisons, like typhoid discharges, cannot be certainly rendered harmless by any amount of filtering. The well water must be boiled if it is bad, or it must be abandoned. The filters are useless with poor wells, needless with good ones, and only recommended for rain water cisterns.

Let no lead or copper come in contact with the rain water, not even lead paint. If a pump is used let its pipe be simply iron, or if that is objectionable from rusting, have cast iron pipes, which can be very effectually protected from the action of the water by plunging the newly cast pipes heated to 500° Fahrenheit into a bath of melted pitch and heavy mineral oil, heated

to about 450° Fahrenheit. This coats them with a permanent varnish.

Descriptions of the larger filters for cisterns may be found in Eassies' *Healthy Houses*, published by D. Appleton & Co., New York, and also in Knight's *American Mechanical Dictionary*, published by Hurd & Houghton, New York.

Animal charcoal is recommended for these enclosed filters rather than simple sand, which is better adapted for intermittent filtration, with frequent access of air.

VACCINATION.

BY E. J. MARSH, M. D.

It is almost impossible for an inhabitant of a civilized region at the present date to realize or form a distinct conception of what smallpox was before the discovery of the protective power of vaccination, and yet a faithful representation of its horrors and terrors at that time is necessary to enable us to appreciate our present advantages, to make us carefully guard our precious prophylactic, and at the same time diffuse its benefits, unaccompanied by any danger, as widely as possible among mankind, and in so doing honoring, above all other benefactors of humanity, the name of Edward Jenner.

It is unnecessary to investigate the origin of smallpox, whether it has existed for thousands of years, as long as our written records of history extend, and was one of the numerous forms of disease described by those ancient writers under the common name of "plague." It was first accurately described by the Arabian physicians, and was probably first introduced into Europe in the sixth or seventh century. The first recorded case of smallpox under this peculiar name is that of Elfrida, daughter of King Alfred.

Since that time it has always existed in Europe, though, owing to its peculiar characteristics, not with a uniform degree of severity. These characteristics are a great fatality, extreme contagiousness, and the power of affecting every individual, but affecting them only once in a lifetime. Hence when a district remained free from it for some years, it would be brought by some casual traveller, or perhaps parcel of wares, and thereupon it would quickly spread to those within reach, and the circle of its influence widen until all became affected; then the epidemic would disappear through exhaustion of material, and perhaps it might not be seen for many years and until a new generation had sprung up. From the larger cities smallpox was seldom

altogether absent, but prevailed with varying degrees of severity; like a forest fire at times blazing furiously, then subsiding under the influence of rain or for want of combustible material, smouldering and creeping along quietly, and breaking out unexpectedly with renewed violence.

There was no disease so contagious as smallpox. Sir Thomas Watson writes, "there is no contagion so strong and sure as that of smallpox, none that operates at so great a distance. It is readily communicable in every way; by inoculation, by breathing a contaminated atmosphere, by the contact or vicinity of fomites (clothes, bedding, &c.) Nay, it may be caught from the dead body." Every person was susceptible to the disease, the exceptions at most being extremely rare. It has been estimated that, of every hundred persons born, only four reached the age of thirty years without undergoing smallpox, and a middle-age proverb says: "From smallpox and love few remain free."

It was one of the most fatal of all diseases. About one-fifth of all attacked died. Among infants its death rate was fifty per cent. or more, and the same was the case in old age, but during youth and middle life a large proportion recovered. In some fortunate cases the disease was very mild and the patients recovered with only a few pock marks. In others the face was deeply disfigured, or the constitution was enfeebled and broken down, while a few completely lost their eyesight. Before the time of Jenner thirty-five out of every one hundred cases of blindness were caused by smallpox. Now it is seldom met with from this cause. The Napoleon medal in honor of vaccination represented Æsculapius protecting Venus—the god of healing protecting the goddess of beauty—and one of the most distinguished French writers on hygiene enumerates the benefits of vaccination as follows: "It has diminished the number of blind, protected the native beauty of the human race, prolonged the average of human life."

During the eighteenth century thirty thousand persons died annually in France of smallpox, and during the last thirty years of that century the mortality from the same cause in England was from thirty-four thousand to thirty-six thousand. And for those whose minds are impressed by large numbers it will be interesting to state that during the hundred years preceding

vaccination smallpox is calculated to have destroyed forty-five millions of the people of Europe.

We have few mortality reports of our own country during the last century, but the following is probably a fair representation of what was passing elsewhere as well. Smallpox was introduced into Boston in 1721, after an absence of nineteen years. The population was about sixteen thousand, and within two years the disease attacked six thousand persons, of whom eight hundred and forty-seven died. There was another epidemic of smallpox in 1752, during which five thousand five hundred and forty-two persons contracted smallpox, and two thousand one hundred and thirteen others were inoculated, or nearly half the population was affected with the disease. The burial records of New York show that during the fifteen years preceding vaccination five thousand seven hundred and fifty-six persons were buried in St. Paul's and Trinity church yards, six hundred and ten or more than one-tenth of whom died of smallpox.

The dangers of smallpox were diminished to a considerable extent by the introduction of inoculation in the year 1721. This practice consisted in inserting into the skin of a healthy person by a lancet a small quantity of the matter taken from a smallpox pustule. This in due time produced the same disease, but in an extremely mild form, so as only rarely to cause death. Under favorable circumstances once in five hundred cases. This practice of engrafting or inoculating was of very great benefit to the individuals on whom it was performed, substituting a mild form of disease, with very little danger of death or disfigurement, in place of a very severe and fatal one. But although it was thus of very great value to the individual, it was often the reverse to the community, as it kept the disease constantly alive and spread it broadcast through regions which otherwise might have escaped, and hence diminished little, if at all, the total deaths from smallpox.

In the year 1798, Dr. Edward Jenner published to the world his wonderful discovery of the protective power of vaccination. Many years before, in early youth, he had heard that persons employed in dairy work occasionally became affected with sores on their hands and fingers, which were supposed to have been contracted from the cows, and that such persons were forever protected from the influence of smallpox. Similar occurrences

had been reported to other physicians, and corresponding observations made by them, but they had noted them only as curious phenomena and pursued the subject no further. To Jenner, however, they were more than curious and interesting; they contained promise of a result well worthy of close study and investigation. Narrating the facts to his seniors and teachers in London, he was by them encouraged to pursue the investigation, and afterwards, when settled in practice in an agricultural community, and devoting himself to a physician's work with ardor and enthusiasm, he availed himself of every opportunity to examine the histories of such cases, experimented as to their non-susceptibility to smallpox, and studied the peculiar diseases of the cows. After years of study, meeting at times with difficulties that appeared almost insurmountable, he convinced himself that he had arrived at a firm basis of truth and fact, and published his observations and belief to the world. He had ascertained that cows were liable to several forms of eruption, which might be communicated to the hands of the milkers; that one of these forms produced a peculiar sore on the hands, and that the person thus inoculated was thereafter insusceptible to smallpox—could not be made to take it. He further found that this disease of the cow was similar to and often propagated from a sore occurring on the heels of horses, and that matter from such a source would also protect from smallpox. Jenner believed that the eruption in the cow was smallpox, and named it *variolæ vaccinæ*, and that it produced in the human being smallpox in an extremely modified form, and that this was the reason for the insusceptibility to smallpox afterward. It was so extremely modified and reduced, as it were, to a minimum, that it produced only one small local sore or eruption, had lost its contagious nature and could be conveyed only by direct inoculation.

This was the first step in the discovery of vaccination, but thus far it was of little practical use. The disease was found in the cow only at comparatively rare intervals, and might be easily confounded with some other eruptive diseases, and hence even with all due care and knowledge could only be conveyed to some few fortunate individuals. Jenner's next and most important step was the attempt to transmit the disease from one individual to another, and ascertain whether in such an event it would still retain its protective power. This experiment he tried on May

14th, 1796, which is therefore considered the birthday of vaccination. Matter was taken from a sore accidentally inoculated on the hand of a milkmaid from a cow, and inserted into the arm of a small child. A vesicle and sore similar to the first was produced, and a few weeks after it had healed, smallpox was inoculated and the child was found to be proof against its influence. Jenner repeated the experiment with similar result as occasion offered, and thus established the fact that a simple, safe and efficient protection against, or rather substitute for, smallpox had been discovered.

After the publication of Jenner's book, the progress of vaccination was rapid. It met with some enemies and some opposition, and was injured by the conceit and incomplete knowledge of its friends; but it was so simple in its theory and in its practice, so easily tested as to value, and of such vast promise of benefit to mankind, that it found everywhere intelligent, zealous advocates, who bore down all opposition and spread it to every part of the civilized world.

Dr. Benjamin Waterhouse, Professor of the Theory and Practice of Medicine in Harvard University, Dr. Valentine Seaman, of New York, Dr. S. P. Griffiths, of Philadelphia, and President Jefferson deserve special mention for their active interest in introducing and promoting vaccination in this country. The first vaccinations in the United States were performed by Dr. Waterhouse upon his own children with matter obtained from England, and, the vaccinations being successful, he subsequently, in the most public manner, had them inoculated with smallpox matter in order to display the protective power.

The practice of vaccination having thus spread rapidly through the civilized world, smallpox as rapidly diminished. Dr. Jenner believed that "vaccination, duly and efficiently performed, would protect the constitution from subsequent attacks of small pox as much as that disease itself will," and hoped that the annihilation of small pox, the most dreadful scourge of the human species, must be the final result of this practice." This belief was well founded, and the hope was not extravagant or unwarranted as far as the nature of the disease was concerned; but it should have required comparatively little knowledge of human nature to dampen the ardor of these expectations. Smallpox was not the only foe to

be fought. It had for allies, ignorance, conceit, carelessness, obstinacy. The very simplicity of the operation proved an obstacle to its due and efficient performance, for everyone who could handle a lancet considered himself at once qualified to operate without implicitly following the master's directions in minor details, and Jenner was constantly occupied in correcting erroneous methods of procedure. Moreover, provision for the future is not the rule in humanity. Absent dangers as well as absent friends are forgotten, and the very diminution of small pox would lead to a neglect of vaccination. Consequently, now, after a period of eighty years, we find smallpox still existing in the world, and, although shorn of its former powers, still yearly demanding its victims.

The practice of vaccination spread rapidly, institutions for the vaccination of the poor being established in the larger cities, and the mortality from smallpox almost at once diminished; from some districts it was entirely absent for years; epidemics became very infrequent. The actual value of vaccination to communities is well shown by a comparison between the death rate before and since its introduction. In England, before vaccination three thousand, and since vaccination two hundred and twenty-one out of every one million of inhabitants have died annually of smallpox. The following figures will show the same results in several other European countries:

COUNTRIES.	DEATH RATE BY SMALL-POX PER 1,000,000 INHABITANTS.	
	Before Vaccination.	After Vaccination.
Lower Austria	2,484	340
Upper Austria	1,421	501
Bohemia	2,174	215
Prussia, eastern portion	3,321	556
Prussia, western portion	2,272	356
Westphalia	2,643	114
Sweden	2,050	158
Berlin	3,422	176
Copenhagen	3,128	286

In this country we have few mortality reports of the last century, and a single comparison must suffice. As before stated, there were epidemics of smallpox in Boston in 1721 and 1752, when the population of the city was about sixteen thousand; in the first the deaths were eight hundred and fifty, or one in every nineteen inhabitants; in the second the deaths were five hundred and forty-four, or one in every twenty-nine inhabitants; in 1872–73 occurred the most severe epidemic for many years, and the deaths were one thousand in a population of two hundred and fifty thousand, or one in every two hundred fifty inhabitants. But it is quite unnecessary to appeal to statistics to show the vast difference in the prevalence of smallpox before and since the discovery of vaccination. Everyone's own individual experience now tells a different story, from the experience of two hundred years ago, when in the words of the eloquent historian, "Smallpox was always present, filling the churchyard with corpses, tormenting with constant fear all whom it had not yet stricken, leaving on those whose lives it spared the hideous traces of its power, turning the babe into a changeling, at which the mother shuddered, and making the eyes and cheeks of the betrothed maiden objects of horror to the lover." We have all within a few years passed through an epidemic of smallpox, unequalled in severity for half a century, and yet what have we felt and what do we see? Most of us have enjoyed a sense of protection and personal safety, few have lost any of their friends, relatives or immediate social circle. We see on the streets no scarred faces, no sightless eyes. The mortality has fallen almost entirely on those, who from carelessness or prejudice, had neglected vaccination. A few have suffered, notwithstanding a supposed security from this protection but generally have had the disease in only a mild and modified form. The power of vaccination is shown perhaps still more vividly by individual examples in the very presence of smallpox. Dr. Marson, of the London Smallpox Hospital, says: "For just thirty years we have re-vaccinated all the nurses and servants who had not had smallpox on their coming to live at the smallpox hospital, and not one of them has contracted small pox during their stay here." A similar experience has been found among physicians. At a meeting of the Medical Society of London, when about sixty practitioners were present, those

who had taken smallpox after vaccination, were requested to hold up their hands, and of the whole number only four or five were raised. All of them, however, had repeatedly exposed themselves to infection. After a remarkably severe epidemic of smallpox in Milan in 1870-72, it was reported that "of the medical fraternity, including those brought most of all into contact with the disease, but at the same time most safely protected by vaccination, not a single serious example of the affection appeared during the whole period of thirty months."

The writer has frequently vaccinated persons exposed to the contagion of smallpox—persons living in the same house, or even nursing the sick, and has then confidently assured them of complete protection from the disease, and in no instance has such assurance been negatived. The disease has never spread when all those exposed to it were vaccinated.

Jenner believed, as before stated, that vaccination, "duly and efficiently performed," would protect from smallpox as much as an attack of the disease itself, and as second attacks of smallpox were occasionally met with, he expected the same after vaccination. For several years this seemed to be the case, but about 1820 it was noticed that where smallpox prevailed, a certain proportion of the vaccinated were taken sick with a fever and eruption somewhat similar to the original smallpox, but differing from it in certain points, and especially in the very important one of seldom causing disfigurement or death. The disease was called "varioloid," meaning "like small pox." This name, though still used, is unfortunately chosen, as it tends to conceal its real nature. It was really smallpox, "modified" in its course, and rendered mild by the previous vaccination. But though mild itself it was capable of communicating the true smallpox in malignant form to the unprotected. Notwithstanding these cases, the rule of protection by vaccination still held good, and it was only in a comparatively small number that the smallpox afterwards was seen. Jenner believed that in all these cases there was some want of care in the original vaccination, or that the vaccine vesicle had not gone through its course in a perfectly normal manner. And this opinion was undoubtedly correct in the majority of instances, and the imperfect scar on the arm often demonstrated the imperfection of the original process.

The power of vaccination is shown almost as much in this modifying influence as in its protective powers. In the London Smallpox Hospital, two thousand six hundred and fifty-four unvaccinated patients were admitted, of whom nine hundred and ninety-six, or 37 per cent. died, while of four thousand eight hundred and ninety-six vaccinated patients only four hundred and two, or 8 per cent. died. Of sixty-one cases occurring under the observation of the writer in 1872, thirty-one had not been vaccinated, of whom eighteen, or 58 per cent. died, while of thirty vaccinated only one died.

When these instances of varioloid or post vaccinal smallpox became numerous, the question was asked whether the protective influence became exhausted in the system after a certain period of years, or whether the vaccine virus had degenerated by passing through a number of individuals and becoming humanized. That the former is correct is now generally acknowledged to be true, and it has been found that the period of life during which the protective power suffers most loss is the period of growth from childhood to adult age, and it is also found that an efficient revaccination at this period will renew and complete the protection for life. This is the opinion of those who have had the largest experience with smallpox. Dr. Marson writes, "very few patients have been admitted with smallpox into the hospital who stated that they had been revaccinated with effect." Dr. Grieve, Medical Superintendent of Hampstead Smallpox Hospital, says that out of six thousand two hundred and twenty-one cases admitted, in only three could any satisfactory proof of revaccination be discovered. He expresses his conviction that *revaccination is a sure protection against smallpox*, and that cases of small pox subsequent to revaccination are merely the exceptions that prove the rule; they are more uncommon than second small pox. The physicians of the Dublin hospitals after the epidemic of 1872 reported the same experience and expressed themselves to the same effect.

With regard to the second question, whether the vaccine virus has degenerated by transmission through a long succession of human beings, medical opinion is not unanimous. That it may and frequently does degenerate is undoubted, but that it necessarily does so is not sustained by facts.

Jenner wrote: "The matter may undergo a change that may

render it unfit for further use, by passing even from one individual to another, and this was as likely to happen in the first year of vaccination as in the twentieth. * * I vaccinate here weekly, and the vesicles are in every respect as perfect and correct in size, shape, color, state of the lymph, the period of the appearance and disappearance of the areola, its tint, and finally the compact texture of the scab, as they were in the first year of vaccination; and to the best of my knowledge, the matter from which they are derived was that taken from a cow about sixteen years ago."

Dr. Marson, while admitting the frequent degeneration of humanized virus, and advising an occasional return to the cow, says "we have frequently produced, lately, with lymph brought into use by Jenner more than fifty years since, vaccine vesicles which on comparison, exactly correspond with vesicles sketched in Jenner's original work explaining and illustrating the vaccine disease."

The practical rule for the physicians will be to use virus that is proved good by producing typical vesicles, pursuing their course regularly and leaving behind well marked cicatrices, but as soon as there is any inferiority in the vesicle or any irregularity in its course or cicatrix to abandon it and seek a new stock from animal virus, which now fortunately can easily be obtained.

When vaccine lymph is introduced by puncture beneath the skin the following appearances present themselves: For the first two days no particular effect is noticeable, by the third day a slight pustular elevation is perceptible; and this by the fifth or sixth day has become a distinct vesicle of a bluish-white color, with a raised edge and a peculiar central cup-like depression. This gradually enlarges and by the eighth day has attained its highest perfection. It is then plump, round, more decidedly pearl colored, it is distended with clear lymph and the elevation of the margin and the depression of its centre are more marked. At this date, or sometimes a few hours earlier, a ring of inflammation termed the areola begins to form around its base, and the vesicle and areola together continue to spread for the next two days. The areola is circular and has a diameter of from one to two inches; it is often attended with considerable hardness and swelling of the subjacent cellular tissue. The areola is the occular evidence that the vaccination has produced its

ecific effect upon the constitution. Generally at this period e constitution shows sympathy with the local disease; there slight feverishness, restlessness and heat of skin with some erangement of the stomach and bowels, though these symp- ms are sometimes very slight. After the tenth day, the areola egins to fade, the vesicle begins to dry in the centre and by the fteenth day a hard, dry, brown scab is formed. This scab enerally contracts, hardens, dries, and falls off about the twenty- fth day, leaving a cicatrix which is commonly permanent, nd which in character is circular, somewhat depressed, fove- ted, or indented with minute pits and sometimes radiated.

When the vaccination is done by abrasion and not by punc- ure, it may develope as above, if of small size, or if larger, two r three vesicles may rise, which will coalesce into one large ne, either circular, or oval or other irregular shape. This repre- ents the normal course of a primary vaccination; it may be ccelerated or retarded for a few days, but any other variation hould be regarded as modifying its protective power, and ren- lering it doubtful.

The vesicle of a revaccination does not follow exactly the same ourse; generally it runs its course more rapidly, the vesicle eing small and the areola formed on the fourth or fifth day. The axilliary glands are generally affected, and there may be onsiderable headache, nausea, malaise for one day at least. Oc- asionally the vesicle follows precisely both in form and pro- gress the course of that of a primary vaccination.

After the vaccination sore has passed through this normal ourse, the subject cannot be made to take smallpox either by in- oculation or contagion, but it is sometimes important to know at what precise period this immunity occurs, as in cases where persons who may have been exposed to smallpox contagion request to be vaccinated, or ask what assurance can be given them of protection by vaccination. As a rule of practice it is well to vaccinate at any period after exposure until symptoms of the disease actually set in, because infection does not always occur with the first exposure, nd there is no certainty as to when it has actually occurred. After vaccination the mark of protection is the formation of areola. The vesicle may be perfect and still smallpox ensue in evere form, as the writer has seen on more than one occasion, ut if the areola be formed without the appearance of any symp-

toms of smallpox, the subject is then secure. "When small pox has been taken into the system there is twelve days freedom from illness generally, forty-eight hours illness and then the eruption begins to appear on the skin. The areola of vaccination is not fully formed until the ninth or tenth day of the progress of the vesicle, so that unless there has been time for the areola to be formed after the vaccination before the illness produced by small pox begins, the vaccination will not be of the least benefit." In other words, if a person be exposed to the small pox contagion, the first symptoms of the disease would appear in twelve days; vaccination requires a period of ten days to protect, therefore if a person be vaccinated within forty-eight hours after exposure the protection will be effective; if vaccinated within the subsequent twenty-four hours, the areola will have commenced to form before the illness of small pox begins and the disease will be modified; vaccination done subsequent to this period will be of no avail whatever. Dr. Marson says, "this we have seen over and over again, and know it to be the exact state of the question." As the revaccination vesicle generally developes in a shorter period than the original, revaccination performed even four days after exposure to contagion may prevent the development of the disease.

In order that vaccination may confer its full protective power, it must, as Jenner said, "be duly and efficiently performed." Unfortunately the method appears so simple that many medical men neglect the study of the essentials of success, and nurses and mothers, who have never heard of them, attempt to imitate the example of their physician. And it is undoubtedly to this carelessness and consequent bad vaccination, that so much post vaccinal smallpox has been due.

The operation of vaccination includes three considerations:

First. The selection of the virus.

Second. The method of operation.

Third. The condition of the person to be operated on.

1st. The selection of the virus.—The vaccine virus consists of the lymph or crust taken from the vaccine vesicle on either a human subject or a cow. The former is used in a large majority of cases. It should be taken only from a first vaccination of a healthy, strong infant—healthy both in general appearance and on special investigation as to any possible constitutional disease.

hould never be taken from adults or from a *re*-vaccination
. The former, on account of a greater likelihood to such
ase; and the latter, because the protective power is much
, or may even be wanting, as in the following instance given
he Report of the New York Board of Health for 1871: "A
her obtained matter from a healthy *re*-vaccination vesicle on
arm of a friend at the eighth day. She vaccinated her four
dren, none of whom had ever been previously vaccinated,
ı this virus; the vaccination was, to all appearance, success-
in each case, full, healthy-looking vesicles, maturing on the
ıth day. Almost a month afterwards all four children were
:ken with the smallpox."

. physician should, under no circumstances, make use of in-
ɔr vesicles, but use the utmost care in selecting from only the
ɣ best subjects; just as a gardener prefers the seeds from the
; specimens of his plants. When the stock deteriorates or
ɜ, or if he or his patients have such a preference, he should
ırt to the animal vaccine, an excellent supply of which is now
t in market. It is not necessary to discuss which lymph is
ferable, or if there is any general preference of one to the
ɜr. Either, *when good*, will effectually protect, and is entirely
oid of danger. Human lymph must, for a long time, be the
chiefly used, still it is apt to deteriorate, and is, on rare occa-
ıs, subject to a danger from which animal virus is free. The
mal virus has hitherto been carefully propagated and worthy
ɔnfidence, but as the demand for it is increasing, and it is
ɔming an object of trafic, there is a very great probability
t much will be offered for sale entirely unworthy of confi-
ce, inert or even injurious.

ɹs soon as the vesicle forms, the lymph is fit to use, and on
fifth day it is particularly active. The quantity is small,
ɾever, and it is better to wait till the eighth day, when the
icle is full. This is usually, however, the last day on which
ıould be taken, as afterwards, when the areola has commenced
form, it is far less successful. Jenner laid it down as a
ılden rule," never to take lymph for vaccination after the
nation of the areola. He found that such lymph was not
y less active, but that even when it did produce a regular
ɾ pox, it frequently failed to protect the system from small
:. Lymph is taken by pricking the vesicle in one or more

points with the point of a lancet, or a needle. A few drops of lymph will exude from each puncture, which may be used while fluid by inserting into the arm of another child, or applying to an abraded surface. This arm-to-arm method is the best possible, and is most uniformly successful, but unfortunately can only be applied in vaccinating institutions, in families where there are several members to be vaccinated, and in a few other instances. Generally the lymph must be preserved for a longer or shorter time, and carried to the person to be vaccinated. It may be taken on the point of the vaccinating lancet, and dried there; but the usual method is to collect the exuded lymph on the surface of a quill or ivory point and allow it to dry. These points should then be carefully wrapped up, and kept away from the atmosphere. Another method is by the use of capillary glass tubes; a drop of the virus may be collected in such a tube, the ends of which are then closed by sealing wax, or by melting them in an alcohol lamp; only enough for a single vaccination should be put in each tube. The lymph thus excluded from the air will remain liquid for months and years, retaining its activity, and may be used in the same manner as fresh lymph by breaking off both ends of the tube and blowing it out on the point of a lancet or a piece of glass. Not more than half a dozen quills or tubes should usually be collected from one vesicle. No pressure should be used to make the lymph exude, and if the slighest tinge of blood is visible in the lymph, it must not be taken.

The crust or scab formed by the drying of the vesicle, separates from the cicatrix about the twenty-fifth day. It was first recommended for vaccination purposes by Mr. James Bryce, of Edinburgh. He described its formation as from the early and active lymph of the vesicle, the drying process beginning as early as the fifth or sixth day in the centre. He recommended it as being equal in power to the most active lymph, as affording a more abundant supply, and as being able to be kept for a longer period, and obtained more easily. This form of virus has been much used in this country, on account of the advantages above enumerated, especially the facility of obtaining and preserving it in town and country practice where there are no public institutions to depend upon. It is also extremely active in its power, and gives

more success than any other method, except the arm to arm method. It is a valuable supply in times of small pox epidemics, when a large quantity is virus is required, for while a vesicle will only charge five or six quills, a good crust will vaccinate twenty or thirty, or even more persons. The same care must be used in selecting crusts as in selecting lymph, and they must be taken only from excellent vesicles which have gone through the regular course in children known to be healthy. Mr. Bryce thus describes the character of the proper crust: "It is those crusts only which can be ascertained to have been formed from the vesicle after it has run through a regular course, and which, when separated from the part, are found, on examining them by a strong light, to be nearly transparent, which I would recommend ever to be used." Dr. J. P. Loines, of New York, described the crust as composed by a drying and purifying process, so as "to leave the lymph almost by itself, hardened, amber-colored, semi-crystaline, diaphanous and covered by the hardened cuticle which varies in color according to the surrounding skin, the product falling off in the shape of a very thick, roundish, countersunk scab. Its thickness should be about one-third of its large diameter. It is probably the thickest and heaviest scab produced upon the human body."

2d. The method of operation.—If fluid lymph be used, whether from arm to arm, or from capillary tubes, the point of the lancet should be dipped into the lymph and inserted by a puncture beneath the epidermis; a drop of blood may follow, but this will not often wash away the virus. Or instead of this method, a series of transverse scratches may be made, or a small portion of the epidermis abraded by a lancet—a dull lancet being preferable—or by the vaccinator, made of short needles, like a rake. In either case a surface should be exposed or cut across, equal in size to a split pea, and the lymph rubbed on with the flat side of the lancet; it is an excellent plan to rub the lymph first on the surface of the skin and then scratch through this, and afterwards apply lymph a second time. If the dried lymph on quills, or the crust is used, the skin is to be scratched or abraded in the same manner, the quill to be dipped in luke-warm water so as to soften the lymph, and then rubbed for a minute on the abraded surface. If the crust be used, it is to be pulverized by

crushing between two pieces of glass, then moistened with water and rubbed up until a sort of emulsion is made, and this is then applied by the flat side of a lancet. No more should be mixed than sufficient for the operations proposed, and if any remain it should be thrown away, and under no circumstances should it be laid aside for a subsequent occasion. After being mixed with water it rapidly decomposes, and becomes either inert or positively injurious. Occasionally a small piece of crust is inserted beneath the skin by a puncture, or the powdered crust by a vaccinator, made of a hollow needle with a piston. The writer has never seen this method used, but it is said to be very successful. Whatever method be used, it is of strict importance that the lancet or instrument used should be perfectly clean. A minute quantity of blood is usually drawn, and there is more danger from this source than almost any other. The lancet, therefore, should be dipped in hot water and wiped after each operation, or when practicable it should be cleansed by passing through the flame of an alcohol lamp.

Jenner thought that the formation of one single vesicle was sufficient to afford entire protection, and so it undoubtedly is in the majority of cases. There is reason to believe, however, that the protective power does to some extent depend upon the amount of the local affection, and consequently many physicians prefer to make numerous vesicles. It has not been shown that the number of the vesicles affects the *liability* to the disease, but Mr. Marson has shown from the large experience of the London Small Pox Hospital, that the severity of post-vaccinal small pox does have a direct relation to the number and quality of the vesicles. He found the mortality proportioned inversely to the number of vaccine scars. The mortality among those having one vaccine cicatrix only was 7.73 per cent., of those having three or more, was 1.22 per cent. Among those having *well-marked* cicatrices the mortality was 2.52 per cent.; among those having badly marked cicatrices, 8.82 per cent.

Dr. Marson's own practice was to vaccinate from arm to arm by puncture, and to make six punctures about half an inch or less apart from each other. When vaccination is done by abrasion the vesicles will be much larger, being a compound vesicle formed by the coalescing of several small ones. It would appear rational that there should be no difference between the effect of one large

vesicle of this nature, and that of several small vesicles, and therefore the area of cicatrices is of importance rather than the number of cicatrices. Dr. Loines recommended the formation of a cicatricial surface equal to the area of a circle three-quarters of an inch in diameter. The small vesicles have an advantage over the large one in that they are less liable to be ruptured.

The vaccination process should be seen by the physician as frequently as possible, and at least about the seventh and tenth days, and also when the scab has separated.

In the presence of small pox, that is where a person may have already been exposed to the contagion of small pox, it is advisable to vaccinate in at least two places, so as to give additional surety of success. If one point should not "take" the other may, and immediate success is absolutely necessary and no chance of failure can be allowed.

3d. The condition of the person to be vaccinated.—In the presence of small pox every unprotected person should be at once vaccinated, but in ordinary circumstances there are several conditions to be considered. Healthy infants may be vaccinated within a few weeks after birth, and the operation should, if possible, be done before teething; the third and fourth months are perhaps the best time. If done while the teeth are coming through the gums, convulsions occasionally are induced from this double irritation, and under these circumstances they are always attributed by the parents to the vaccination. If a child is at all sick, or weakly, it is well to defer the vaccination until recovery; this is advisable especially where there is any cutaneous eruption, as these frequently modify the course of the vesicle, and in the opinion of Jenner often interfered with the protective power; even a slight eczema behind the ears should be healed before performing vaccination. The Spring and Autumn are the best seasons for vaccinating, and it should be avoided during Summer as much as possible, partly because infants are more liable to sickness at this season, and also because during the hot weather the children are more apt to scratch and break the vesicles. Vaccination should never be performed if there is a case of erysipelas in the house, or if the disease be prevailing in the vicinity.

Revaccination should be performed under the same conditions as vaccination, except of course as to age. All persons should

be revaccinated between fifteen and twenty years of age, and if the operation be unsuccessful it should be repeated at occasional intervals until success be obtained. Failure of the revaccination is not absolute proof of the continuance of the protection of the first vaccination. The rule is that no adult can be *assured* of protection against smallpox until he has undergone a successful revaccination.

When properly performed, vaccination is almost uniformly a perfectly safe and trifling operation. Still in a few instances it has been followed by serious consequences, and both the frequency and severity of these have been so greatly exaggerated as to give rise to a certain prejudice against its employment. The objections urged against it are—

First—The immediate danger from the operation.

Second—The introduction into the system of some constitutional disease together with the vaccination.

1st. The immediate danger consists in the occurrence of unhealthy inflammation and ulceration, or of erysipelas starting from the vesicle. The former occasionally occurs, but almost never when good fresh virus is used, and any tendency to inflammation can be arrested by rest and soothing applications. Erysipelas may supervene after vaccination, just as after any scratch or wound, and it is the scratch and not the vaccine process that causes it. As erysipelas in young infants is a serious, and sometimes fatal disease, such cases are fortunately rare, and generally may be attributed to the constitution of the child or exposure to the contagion of the disease. They are often seen when erysipelas is prevailing as an epidemic.

2d. The fear of inoculating some other disease is the chief danger in the eyes of the parents, who are not less desirous than the physician that the matter should be taken from a good healthy child. They fear lest a feeble child should graft its own feeble constitution, or a sickly child, a tendency to scrofula and cutaneous eruptions.

It has been demonstrated to the satisfaction of all physicians that there is no possibility of such infection, but scrofula and cutaneous eruptions are extremely common affections, and when they make their appearance subsequent to vaccination, it is natural that parents should rather accuse the vaccination, than the natural constitution of their children.

The charge of inoculating other disease unfortunately cannot be entirely denied, and that, too, in the case of one of the most serious infections—syphilis—but even here vaccination in the large majority of cases has been unjustly accused. All post-vaccinal syphilis is not the result of the vaccination, and the order of their occurrence on the skin is not the order in which they were acquired; and yet here more than in all other cases the parents would prefer to accuse the vaccination.

A few cases have occurred, however, which admit of no other conclusion than that syphilitic poison was conveyed with the vaccine. Such cases, however, are extremely rare. The majority of physicians, of the highest repute and largest experience in the treatment of both classes of cases, vaccination and syphilis, have never met such instances. There is reason to believe that where syphilis has been so transmitted, it has been due to a want of proper care in taking the lymph, which instead of being pure has been mixed with blood. Whether syphilis can be conveyed by pure vaccine virus is not yet absolutely determined. But it certainly can be conveyed by blood, and it is extremely probable that in all the reported cases, it was so conveyed by a few drops of blood effused into the lymph by careless handling, and then taken up on the lancet or quill. The danger of this infection is so slight that it really is no objection to vaccination, but only an additional incitement to the physician to use the utmost care in selecting and collecting the lymph, and to be certain of the cleanliness of his lancet before operating. If doubt, fear or prejudice still continue on the part of physician or patient, a resort to animal vaccine virus will do away with all difficulties.

Since the annihilation of smallpox is of such great importance to the community, it may be proper to consider here whether the State government can or should in any way exert its authority and influence to confer the protection of an efficient vaccination upon all its citizens. The State has certainly the right to require, in the interest of public health, that every person should be vaccinated, and it is no unwarrantable interference with personal liberty to take away the liberty of conveying to others a loathsome and fatal disease; but before enforcing this right it should first give them assurance of a safe and efficient vaccination. Such assurance it cannot give at present, for the

operation requires medical knowledge and skill, and the State exercises no supervision over the practice of medicine. It is manifestly improper to require its citizens to submit themselves to a medical or surgical operation until it undertakes to provide skillful physicians and surgeons. Moreover, if a law should be enacted, requiring the vaccination of all infants, as is the case in England and some other European countries, it would be impracticable of enforcement without a more extended machinery of police and oversight of individuals than we now have, and it would stand consequently as a dead letter on the statute book.

But if it is inexpedient to use authority, the State may use a certain influence by offering facilities for vaccination. This influence it might exert in two ways: by establishing a corps of public vaccinators, and by providing a constant and reliable supply of vaccine virus.

Skillful physicians should be appointed as public vaccinators for every city and township, whose duty it should be to keep the public advised, by circulars and advertisements at stated intervals, of the benefits and necessity of vaccination, and to vaccinate gratuitously all who might desire vaccination. This plan could scarcely be carried out at present, as the State has no method of exercising such control over these communities, but when a general law shall be enacted (at no distant day, we hope) establishing local boards of health in every city and township, such a provision can easily be made.

Meanwhile a great deal of good might be done by the supply of efficient and reliable vaccine virus. The expense would not be great and the benefit would be conferred directly upon every person or family in the State. Individual physicians find great difficulty in keeping on hand a constant supply of vaccine, and they are thus tempted to use an inferior quality. A constant supply of the best human vaccine virus can only be kept up in vaccination institutions of large cities, where there are a large number of infants to vaccinate, and during epidemics of small-pox it is difficult to fill the demand. This difficulty and the fear of the possibility of syphilitic contamination has caused a demand recently for animal virus. At first it was supplied mainly by two or three physicians, whose names were a guarantee of its value. Recently it has been placed on the market and advertised by a number of druggists, from various sources,

and as the demand increases there is every probability that matter of an inferior quality will be offered for sale.

Animal vaccination requires as much care and skill as human vaccination, and should be conducted only by the same thoroughly qualified professional men, and it is of the utmost importance that the supply of virus should not be left to the ordinary competition of trade. There would seem to be a particular propriety in placing the procedure under official inspection or direction, and the establishment of vaccine farms by State Boards of Health would undoubtedly contribute very greatly to the efficient vaccination of the people. Vaccine virus could be distributed gratuitously or at small expense and with an assurance of perfect safety and protective power. Moreover in times of epidemic smallpox, the value of such an institution would be inestimable. At such times the demand for vaccine increases enormously and suddenly. The unvaccinated children are all brought at once, and under this alarm the demand for revaccination now first appears, and the supply of "matter" is soon exhausted. However with an animal vaccine institution this difficulty disappears. A few more heifers are procured, which may each be vaccinated in fifty places if necessary, and in a week's time enough virus obtained to supply the wants of any ordinary city.

Abstracts from Addresses and Papers before The New Jersey Sanitary Association.

BY E. M. HUNT, M. D.

The first meeting was held at Newark, N. J., October 13th, 1875, and was opened with an address by the President, Dr. S. H. Pennington.

He spoke of the necessity of more attention to sanitary matters in this State, and of the need of the co-operation of the people. Human life is in constant peril from deleterious agencies at work within, beneath and around us. Telluric and meteoric emanations and influences, often in localities where they are least suspected, are diffusing themselves through the atmosphere depressing our vital forces, weakening our power of resistance to other pernicious agencies or directly prostrating us with malarious maladies. It is difficult to believe that the fearful waste of human life is due to a defective organization imposed by the Creator. We are compelled to attribute it to causes incident to civilization or called into action by neglect and preventible by the precautionary and corrective agencies that careful investigation and scientific skill may bring to our assistance. Some of the manufactured causes of disease are peculiar to cities—but the country hamlet, even the solitary farmhouse—is not without its perils. The barnyard, the sheepfold, the pig-sty, the unremoved garbage, the compost heap, the cesspool, the privy, the well, the stagnant pool, the pestilential marsh or the neglected mill-pond, will frequently explain the origin of malignant diseases which the sufferer and his neighbors may piously attribute to a mysterious visitation of Providence. Some of the obvious remedies are familiar to you. They

are found in through ventilation and ablution, in the bountiful supply of pure water beyond the reach of cesspools, privies and animal or vegetable deposits; more perfect systems of drainage and sewerage, more efficient police to prevent the sale of adulterated milk and other aliments consumed by our people; to compel the removal of nuisances, not only from streets, but from the premises of citizens; to superintend the construction of buildings; to forbid the overcrowding of the tenements occupied by the poor; to suppress the resorts of intemperance and impurity, whose frequenters are generally among the first victims of epidemic disease; and what is of quite as much importance as any of these, the diffusion of correct principles of hygiene among the people in town and in country and in the institution of scientific commissions to collect and collate facts, and to ascertain the laws governing malaria and miasm, and the most effectual means to counteract and neutralize them.

Dr. Pennington also put in a plea for sanitary attention to animals, and for a closer study of the causes of the diseases to which they too are unnecessarily subjected.

Professor A. R. Leeds discussed the water supply of Newark, Jersey City and Hoboken. He had made analysis of the waters of the Passaic and thought that its impurities had been somewhat magnified.

Dr. Ryerson, of Boonton, thought that the undrained land and swamps along its course added much to its impurity.

Dr. S. B. Hunt read a paper on "atmospheric humidity, in relation to sewage and drainage." The paper showed how largely certain atmospheric conditions influenced the evil effects of sewage and promote disease.

General E. F. Viele read an extended paper on drainage, sewerage and water supply. He carefully distinguished between sewerage and drainage, giving reasons and arguments why they must be kept distinct in practice as they are in fact. The vast amount of poisonous matter discharged into sewers was stated. Unless a sewer is rightly constructed, has a proper descent and is thoroughly flooded it is a public nuisance—a retort from which poisonous gases are thrust into houses through wash basins, water closets and bath tubs. Ventilation of sewers so much ignored in the country must be secured. He suggested

rentilating tubes be placed in the lamp-posts. There should
o a trap between the soil pipe and the sewer.

neral Viele then treated of *Water Supply*, describing the
r source of supply, the proper reservoir, both as to masonry
ize. With a large map he illustrated the Passaic river with
arge areas of saturated soil bordering on it, and its city
saturated with still more dangerous organic matters. The
supply for all the cities should be obtained from the moun-
streams which drain the counties of Passaic, Morris and
n, in New Jersey, and Rockland and Orange counties in
York State. When united they form the Passaic river and
an area of seven hundred and fifty square miles above
Falls, and this would supply ten million eight hundred
and inhabitants. There is ample room below Little Falls
collecting basin, without any interference with the contem-
d removal of the existing obstructions in the river. Near
basin there is on the east side of the first mountain a de-
ion which almost seems formed for a great receiving reser-
inclosing a valley about five hundred acres in extent, the
m of which is three hundred and thirty-nine feet above
water, the outer rim being four hundred and seventy-two
above tide-water. From this great reservoir or aqueduct
e constructed distributing reservoirs, so that all the cities
Elizabeth to New York could be supplied. Co-operation in
plan was urged upon all the great cities of New Jersey east
e mountains.

e paper was discussed by Prof. Leeds, Prof. Cook, Dr. E. M.
t, and others. Prof. Cook, by request, described the course
e Passaic in its variableness of flow. He noted where im-
ies entered the water, and where supplies of clear water
received. He thought that the future probable water supply
lewark, Jersey City, Elizabeth, etc., must come from the
ntains west and north. The hydrant water is impure. He
d prefer General Viele's plan of bringing water from Little
, if it were not for the long level back of that place, where
water which flows along is filled with impurities. He
ght the better plan was to construct reservoirs beyond the
and bring the water over the mountain.

. F. Gauntt, of Burlington, offered a paper on the sanitary
ition and types of disease of Burlington and vicinity. He

claimed that miasmatic disease was the natural result of civilization, especially as men congregated near cities were disposed to interfere with water-courses by dams, wharves, etc. Not only were wet places not drained, but the drainage of nature was interrupted. Malarial fevers had prevailed extensively in his own region. More recently a notable illustration had occurred in one section of the value of efficient legislation. A remedy was found through a bill which gave power to commissioners to go upon the drowned lands and make ditches, sluices and drains. The effect is wonderful. $6,000 expended in this way has during the last four years increased the value of our property, and we are enjoying much better health by comparative freedom from malarious disease. It is interesting to know also that about the same time a freshet broke away the dam of the Assiskunk creek and allowed the tide to flow in its own channel. The usual chills and fever now no longer exists along its borders, while before every person within a mile of it was sure of its pernicious influence.

Mr J. R. Shotwell, of Rahway, read a paper descriptive of the effects of the removal of mill-dams in Rahway, which showed what a great diminution of malarial fevers resulted from the change.

The second annual meeting of the association was held September 28th and 29th, 1876, in the chapel of Rutgers College. The session opened with an address by the President, Prof. Geo. H. Cook, Ph. D. The following is a brief outline of the address:

The work of this association is less exciting but not less important than that of the physician, and is well worthy of the attention of every philanthropist. The statistics of Geneva, London and the British Navy show the following ranges:

Geneva, sixteenth century, forty deaths per one thousand; eighteenth century, thirty deaths per one thousand; nineteenth century, twenty-two deaths per one thousand. London, in 1750, thirty-one deaths per one thousand; 1838, twenty-eight deaths per one thousand; 1873, twenty-three deaths per one thousand. The British Navy in 1770 averaged one hundred deaths per one thousand, and in 1840 ten deaths per one thousand.

Other comparisons were made which, although only approximate, showed that the tendency of hygienic measures is to pro-

long the average period of human life. We recently have been shocked at the Bulgarian atrocities—twelve thousand people having been massacred in cold blood by the Turks; but we have coolly stood by during the past year while, within fifty miles of us, nearly as many and valuable lives have been lost from causes which certainly might have been removed.

Prof. Cook then noticed some of the means by which the death rate had been diminished. Through preventive methods small pox had been greatly diminished. He contrasted its ravages from neglect in our country in some parts, with the deliverance which in other parts results from careful vaccination. Small pox, so common in Ireland, was so much limited by vaccination that in 1863 it was made compulsory. The following statistics are not without their significance:

From 1830 to 1840 the annual mortality from small pox was five thousand eight hundred; 1840 to 1850, three thousand eight hundred and twenty-seven; 1850 to 1860, one thousand two hundred and seventy-two; 1864, eight hundred and fifty-four; 1865, three hundred and forty-seven; 1866, one hundred and eighty-seven; 1867, twenty; 1868, nineteen.

In Copenhagen, after several previous years of compulsory vaccination, there were thirteen consecutive years without one death from smallpox.

The change made in New York and London by the reconstruction of low and filthy districts of those cities was then noticed. The plague had visited London about every twelve years, and in a single century had numbered over one hundred and fifty thousand victims. Although the infection has been frequently brought to London, it has been watched and guarded so that since 1665 it has never gained foothold.

The *collection of vital statistics* was urged, because it would show in time, by hard figures, the causes and courses of disease. Allusion was next made to the importance of providing wholesome drinking water for all.

Many samples of well water have been examined by us which show that the impurity alleged to exist in many well waters is not exaggerated.

Cases near Camden were cited to show how Kensington water had produced diarrhœal diseases. The Professor closed by showing how the average of life could be brought much higher

by sanitary measures instead of being, as it now is, only a little over thirty-five.

The report of the Committee on State Water Supply was made through its Chairman, Professor A. R. Leeds, of Stevens' Institute, Hoboken. Allusion is first made to the several distinct water basins into which the State is divided by the natural lines of demarcation between its water sheds. The character of these water basins needs to be determined:

1. By an accurate hydrographical map upon the basis of a topographical survey.

2. The determination of the rain fall for each water basin, and the number of gallons of water flowing into its several water courses monthly.

3. An examination of the quality of water in each basin.

4. An inquiry into and a tabulated statement of the amount and character of the solution exisiting at present in the water courses of the State. Under this:

(*a.*) The drainage of sewerage along the banks.

(*b.*) Manufacturing statistics, relating to the subject and the proper disposal of contaminatig refuse. Without attempting to discuss or settle these the paper discussed *whether any particular* community has a natural right to the use of the water supply of the water basin in which such community is located in an *uncontaminated condition.* This right is vindicated. The next point is to arrive at a decision "whether a stream, after pollution, can by flowing a limited number of miles in contact with air and growing plants be again made safe drinking water." The report notices the contradictory views of high authorities and shows that in many cases the addition of pollutions does not show contamination down the stream or sickness resulting therefrom. The Passaic river, in New Jersey, and the Blackstone, in Massachusetts, are cited as showing that rivers do have powers of self-purification. Yet this is not always the case and the pollution of the streams which supply water to large cities is an important sanitary question for investigation.

Another inquiry is whether any means, microscopic, chemical or otherwise, exist to discriminate infected and non-infected sewage and if they can be distinguished? The question is not answered.

If sewage and other impurities are permitted to go into a water

supply how much and what kinds are permissable without detriment to health. The report inclines strongly against the pollution of streams, especially those having their exit amid very large cities and insists that Newark, Jersey City, Hoboken, etc., have occasion for earnest study of this subject. It is also urged that there be close study of disease or ill health as related to polluted water supply.

Dr. J. W. Pinkham, of Montclair, followed with a paper on "Wells and House Supply of Water." The evils possible to water in wells and cisterns were briefly noticed. All enrichment of soil by organic matter, and by natural decay or contamination by sewage, by privy vaults, by decaying animals behind stone walls, or from other sources endangers the water supply. We suffer more in low water than when the well is full, since much of the debris finds its way to the bottom and is not uniformly distributed in solution.

How shall a well be constructed so as to avoid or materially decrease the chances of introduction of foreign matter? First, the well above low water should be made of material impervious to water or by omitting part of the wall altogether. The design of this is that it may not act as a drain for the neighboring soil. The wall of the well may be framed from a point two or three feet from the bottom, made of brick with a coating of hydraulic cement.

The earth around should be thoroughly packed so as to prevent the entry of surface waste. To prevent foreign matter getting into the well, you may place a feed pipe in position, arch over the well, and fill the remainder down to high water with earth.

Dr. Pinkham contends that the prevalent notion that a well must be ventilated is not true. The only noxious gases in a well result from the decay of organic matter, which has found its way into the well.

CISTERNS.

Rain water, when collected in cisterns, is liable to contamination from the dust and filth, which collect on roofs and in gutters, or from whatever may get into the cistern besides pure water. The leaders communicating with the cistern should have a shut-

off, so that the water from the roof can be momentarily cut off if desired.

Every cistern should also be provided with a filter. A brick partition modeled in a circular form makes a very good filter. The partition should be carefully built of bricks laid up in cement in such a way that there are no apertures between them. The filter, however, can be made of charcoal, sand or gravel. The cistern, as before, should have a circular partition, but with its convexity toward the smaller compartment, which contains the filter. The first layer of bricks should be laid with space between them. The filter may be made thus: Place in the bottom of this smaller compartment a foot or eighteen inches of charcoal, of pieces about the size of nut coal. Upon this place six inches of ordinary gravel, then six inches of sand, then a foot of coarse gravel. Water passing through is freed of impurities, but this filter will need occasional cleansing. The sand and gravel can be washed and the charcoal by washing and heating in an oven, may be used again.

Cistern water frequently becomes saturated with sewer gas from the cess-pool or sewer. This may occur either from too close proximity or from a connection of the overflow pipe with a sewer pipe. The overflow pipe should either discharge on the ground or into a drain which conveys water only.

G. S. Page, Esq., of Morris county, read a paper descriptive of the head waters of the Passaic river, with especial reference to the great morass of several thousand acres a few miles below its source. Mr. Page advocated a dam twenty-six feet high in Long Hill Gorge, below the swamp, by which its nine thousand acres could be covered to an average depth of twelve feet. This would make the level two hundred feet deep above tide water and Newark, Orange, Elizabeth, Jersey City and Hoboken could have an abundant water supply by gravitation. The plan was regarded as feasible by Engineer Ward, of Jersey City, and Professor Cook, if beside a second reservoir be added below.

VITAL STATISTICS.

Dr. J. L. Bodine, of Trenton, then read a Paper on Vital Statistics. The paper claimed that sanitary science is essentially a science of observation, founded on statistics. It must use the

numerical method of observation, a method widely open to fallacious conclusions, but when rightly used, the basis of all sanitary reform. The past history of disease as shown by statistical returns proves that some epidemic diseases have ceased upon the surrender of the habits of life and the avoidance of the causes which gave rise to them, that others have been diminished and the average of life prolonged.

The researches of Drs. Bowditch and Buchanan as to soil moisture in its relation to pulmonary diseases and of Dr. Snow as to drinking water in its relation to cholera were adduced as instances of the triumph of the statistical method. Its advantages in Great Britain and on the Continent are no longer questioned. The defects in our present State law were then rehearsed and evidence furnished by Dr. Bodine, Dr. Hunt and others, as to the incompleteness and inaccuracy of the returns.

SEWERAGE.

The next paper was by Ashbel Welch, C. E., of Lambertville, on Sewerage. He first raised the question whether animal excrement should not be removed in the same way that animal and vegetable offals are removed. We must not shut our eyes to the fact that sewers are themselves great evils and if imperfectly constructed or badly managed may cause worse diseases than they prevent. The sewer may easily become an extended generator of poisonous and sometimes of deadly gases. The dry air above ground has the chance to dilute and dissipate poison, but the moist air of the sewer is a deadly carrier. Modern improvements are especially convenient for carrying it into the bed-rooms of houses. As many of these noxious gases are lighter than air they ascend to high rooms and to elevations which would otherwise escape. Not only do these noxious gases produce general ill-health or disease, but they also convey some specific poisons and probably originate others. They make many a sporadic disease epidemic. House pipes should therefore not have too close connections with the main sewers. Allusion was made to the poison from sewer gas in a Washington hotel, to diseases which had occurred in Glasgow in houses on elevations since house conveniences had been introduced, and to evils which had been incidental to sewers in Croyden, England, and

in Berlin. Mr. Welch declared bath-tubs, water closets and stationery wash-bowls as now scattered through houses, intense evils. Water traps are unreliable because the water is often blown or sucked out by the pressure of foul gases or the poisons pass through it by being absorbed on the one side and exhaled on the other. The pipes break by imperfect workmanship or become honey-combed by the action of the gases or are too thin or porous at the start. The pipes being difficult of access are not often examined. We may expect in every house with water closets and stationary wash-bowls in the bed-rooms a crop of diseases when the pipes have been used ten or fifteen years. In the wash-bowls the overflow hole constantly open is most convenient for admitting foul air. In 1872 the medical authorities of Edinburgh reported that typhoid fever and some other diseases were doubled in fatality where water closets were used.

Dr. Fergus states that where water closets were used diseases increased four-fold.

Bath tubs are open to similar criticisms, as vehicles for the delivery of foul gases. The author incidentally raised the question whether in bathing all the body at once we do not by shock, by chilliness or by suspending the functions of so large a skin surface run more risk than when one portion after another is moistened and rubbed. If closets, and bath-tubs, and stationary bowls must be had in connection with the house there should be an annex, with supply and sewer connections and special ventilation. The house chimneys, when used for this purpose, must be warmed so that downward currents shall not introduce foul air.

Kitchen sinks should either be outside of the house or being well trapped open into a box outside and thus keep the sewer gas away from the cooks, the food and the household. Grease-traps should prevent the grease from running into the sewer and thus obstructing the pipe or fouling it. The sinks of course need a grating so that nothing but liquids can enter the sewer. Drainage as distinct in many cases from sewerage was insisted upon where the soil needs it. Dampness helps to carry infection. Cellar drains should never enter sewers. Indeed even for drainage and when there is a drainage system outside and around the cellar walls it is better that the whole inside space

should have a porous, sandy or gravel bottom, covered with cement. Where because of area or wetness the gravel bed and outside drainage would not suffice, we may put tile aside of or under the sewer and have a separate discharge and flushing if need be.

Mr. Welch advocated less reliance on sewers for animal excretions and approves the tub system. The plan to be adopted must depend on localities and circumstances.

In either case there is danger in the long retention of fœcal accumulations. The idea was mooted whether disease germs may not find their way into vegetables, when excretions containing specific germs are thrown upon land.

As sewers will be made, the paper then discusses details as to them. They should be small, for economy, for quick discharge and for self-scouring and because there is thus less foul air to remove in ventilation. They should not be expected usually to carry the storm water. If large and having little flowage, they should be egg-shaped, with the smaller arc downward. Salt-glazed pottery, hard burned is the best material, as tighter and less porous than anything else.

The objection to small sewers is that they cannot discharge the storm water. This can run the streets as in Baltimore, or it can be gathered into large conduits, discharging at several points where sewage would be inadmissable. The double system of pipes for sewage and others for storm water is generally disapproved, but needs studying in the light of locality, natural drainage and declivity. Sewage and even stream beds need a constant and not too sluggish flow. The place of outflow is important. It should not be into a sluggish stream or into one used below for water supply.

VENTILATION OF SEWERS.

The usual street hole ventilator, if near the curb is unhealthy, and in very narrow, crowded streets with lofty buildings, does not suffice. It is shown that meat kept near such openings is much more liable to be tainted. Open ends of sewers do not ventilate enough. Artificial ventilation has not always succeeded. The air should be sucked, not blown through the sewers, because it is easier to move air by pulling than by push-

ing and because this draws fresh air into the sewer through every opening, and sends the foul air where you are drawing it to instead of everywhere. The current, except at the ventilators, should be into the sewer. The rarefaction in the sewer should not be so great as to hasten the vaporization of noxious matters and enable the bad gases to spread rapidly even against a current. Mr. Welch then exhibited a plan by which the suction could be made cheaply and effectually. Pipes pass from the sewers into a chamber which has the heated air and flame from a self-heating stove. The heat moves the air in the sewer and helps to destroy germs. A high chimney passes from this chamber so that the foul and heated air thus drawn out is sent above the roofs. It is the application of the principle of an aspiratory chimney to each house. In all these improvements now-a-days we suffer more by unwise and dishonest expenditure than by *necessary* cost.

SCHOOL HYGIENE.

H. B. Pierce, Superintendent of Schools in New Brunswick, read a paper on School Hygiene.

Light, ventilation and heating were presented as claiming far more attention than they have received. Belgium with its model school douse at the Centennial had presented to educators an object of great interest. Pure air is introduced near the base of the wainscot around the sides of the rooms, and by an arrangement over the doors and the windows. Foul air escapes through registers in the floor which open with ducts that lead to a patent stove, from which it passes out through the smoke-flue. The foul air near the top of the room passes out through apertures in the ceiling. Valves for the admission of pure air or for the escape of impure air are under the control of the teachers. In no case, it is claimed, is draft permitted to reach the pupil. The Belgian law requires all school houses to be built on this model.

As to heating, most of our school rooms invert the order of cool heads and warm feet. Often with the temperature at 42° at the feet it is 60° at the head, and the pupils then huddle to the stove and roast and freeze by turns. Where hot air comes from the cellar it is often impure, dusty and with too hot a draft.

As a supplement to that of Mr. Pierce, Dr. H. R. Baldwin read

a paper on the subject of *contagious diseases as occurring in and propagated by schools.*

All transmissible disease to which children are liable we include under the term contagious. While children are subject to many inflamatory diseases, to febrile disorders, to local skin diseases and various disorders of nutrition, and to nervous diseases, too often overlooked as fostered by our schools, these communicable diseases need especially to be studied and guarded against, as spread by the assemblage and association of school rooms.

Parrigo Tinea favosa or scald head. mumps, measles, scarlatina, diphtheria, chicken pox, small pox, and whooping cough were especially referred to.

The duty of parents and teachers is to guard against the spread of these. They spread chiefly by the attendance of children from families in which at the time known cases of the disease exist; by too quick return to school of those who have been sick, or by the wearing and use of clothing not thoroughly cleansed and aired.

In New Brunswick a recent epidemic of diphtheria seemed to have been greatly spread by a school. Parents and teachers must be sensitive in observation and guarded in isolation and see to it that proper precautions are used.

The report of Dr. E. M. Hunt, the Corresponding Secretary, gave an outline of the State correspondence for the year. In each county a competent person had been requested to inform as to the general health and any local causes of disease. Communications had been received from many counties and from several cities full reports were given. Those of Newark, Trenton, Camden and Passaic, were among the most important. Replies were given in answer to a series of printed questions. Great defect in sewerage is noticed not only in Newark, but in such towns as Orange, Bloomfield, etc. Not enough attention is given to saturated soil and stagnant water and hence preventible disease occurs.

The water supply of Newark is not satisfactory. In Essex county a disease among hatters is noticed as occuring from the use of mercury in preparation of the stock. Trenton is favorably situated for surface drainage. It is not properly provided with sewers or other methods for preventing the storage of animal

excrement. Miasmatic disease prevails much along the bank of the Delaware. The Seventh ward, which has a hard clay subsoil and is badly drained, suffers most.

In Hightstown there had been much prevalence of malaria and typhoid fevers and of zymotic or contagious diseases. Defective drainage, imperfect sewerage and neglect as to local evils are claimed.

In Passaic there had been an unusual amount of intermittent and remittent fever, consequent upon the draining of a large pond in very hot weather. The need for sanitary authority has we believe since been felt in regulating the health of the city.

In Camden the local difficulties are imperfect drainage, culverting and imperfect erection of buildings. Some of the factories are regarded as detrimental to health. Since some improvements have been made in the drainage of the city there is manifest decrease of miasmatic disease.

Newton, Sussex county, reports itself as a region of lung diseases. There are some evidences that the wells are not always good, and butter working on a large scale as at present conducted is said to be injurious to the health of those in the milk houses and factories.

In Hackensack, Plainfield, Raritan, Rahway, etc., there are the usual complaints as to the existence of local and avoidable evils.

In a review of all these reports it is very evident that most of our towns and townships lack information and intelligent supervision in sanitary matters. There is often acknowledged imperfection of sanitary methods, but little of that co-operative work which insures systematic and effective dealing with the evils Some of our cities have organizations more or less effective and some smaller towns like Montclair have taken the work in hand with commendable foresight. Such a system of statistics as shall be informatory and such definite local enactments as shall reach special needs are yet to be devised.

The third annual meeting of the Association was held at the School of Science, Princeton, October 17th and 18th, 1877.

SCHOOL HYGIENE.

The Committee on School Hygiene reported through two of its members. The Rev. C. L. Brace as Chairman, after reckoning the importance of the subject by the number of children and the magnitude of the interests involved, proceeded to state the several particulars which most demand attention, and to specify what seemed most desirable in respect to each. Locality should be chosen with reference to healthfulness of ground and without too close proximity of other buildings since light, free air and freedom from noise are so desirable. He approved the suggestion of Olmsted that the corners, not the sides, should be to the cardinal points of the compass, so that the sun's rays would reach every window at some period of the day. Buildings should be not more than two stories high, with rooms for not over fifty pupils. Air space as well as floor space must accord with the amount claimed by standard authorities.

Windows should have blinds on the inside by which light could be regulated. The sash should not be nearer the floor than four feet, but reach nearly to the ceiling. No window should be placed in front of a scholar.

Desks must suit the size of the pupil and also should vary in angle somewhat, according to the work at which he is engaged. The subject of ventilation was fully presented, with the usual facts as to the amount of change of air required.

If furnaces are relied upon for heating great care must be had to avoid red hot cylinders or stoves with badly constructed joinings. When exit pipes are provided for the discharge of used up or foul air, we must be sure that their temperature is such as to secure an upward draught. A central foul air flue inside of the chimney often answers a good purpose. When steam is used steam-coils in the escape flues accomplish the same. S. B. Ward, C. E., has suggested that steam radiators be placed under and in front of each window, there being placed over the radiator and extending to the window sash a marble or other shelf, with a space of three or four inches between it and the bottom of the window. The theory of this is that by raising the lower sash its edge thus coinciding with the shelf in height a strong current of cold fresh air flows in over the radiator, is warmed and diffused through the room.

If stoves must be used, they should be of sheet iron with a brick lining. A stove after the plan of Mr. Stuart's, as described in the "Sanitarian," was advocated as a means of carrying off impure air.

Mr. George Pressey, of Hammonton, has successfully in use a modified method.

The rooms of the High School, in Hammonton, are relieved of their impure air by a box seven inches by eighteen, leading into the chimney by a duct under the teacher's platform. This box is closed by a slide until the fire is made in the stove, when it is opened, the air is carried out, especially the lowest stratum.

The method of introducing air into the Hammonton school building is also described and highly commended. The stove is partly inclosed with a sheet iron case, extending to the floor. Between the case and the stove an opening is made in the floor, fitted with a register about twelve by eighteen inches. This leads to a box placed between the floor and the ceiling, that runs out between two joists to the side of the house, where it is protected by a screen. When the stove is heated the register is opened and the air rushes up coming in contact with the stove and ascends to the ceiling, then makes its circuit through the room, and comes down and passes out through the duct under the teacher's platform. It is important at recesses always to flush school rooms with pure air from open windows, even at the loss of some heat.

The subject of Humidity in its relation to school-room temperature was discussed, and the importance of attention thereto fully illustrated.

Laban Dennis, M. D., presented a paper on the same subject. He noted that within the school age are embraced two hundred and ninety-seven thousand persons, or about one-third of the population of the State. They thus exceed by fifty thousand those engaged in mechanic arts, and fully equal the numbers employed in any two of the great classes of occupation in the State. There are no gatherings of individuals in the State that approach in magnitude or importance to those assembled daily in our schools.

The paper then treats in order of the various subjects: (1) of location; (2) construction and outbuildings; (3) light; (4) venti-

lation; (5) heating; (6) furniture; (7) discipline; (8) personal habits; (9) physical exercise.

All these matters should claim the attention of every citizen and of every physician. But especially must we insist upon instruction in the schools themselves. Beginning with our primary schools and reaching through our highest institutions of learning, there should be regular, systematic and scientific instruction either didactic or practical in anatomy, physiology, hygiene and general sanitary science. This should be made obligatory. Life is the first and greatest subject of secular instruction; how to preserve, protect and prolong it, how to surround it by such influences and circumstances as to contribute to the development of those noblest of God's creatures, types of perfect manhood and womanhood. Allusion was made to the neglect of this department in the otherwise excellent schools of Newark.

Great encouragement is to be derived from the fact that the pupils themselves become ardent helpers. It is a study in which they delight and which introduces them to the whole domain of natural history. If the sentiment and effort of all now aroused could be combined in fifteen years it would revolutionize our systems of education, add greatly to the sum total of human happiness and save thousands annually from premature death.

VITAL STATISTICS.

The report of the Committee on Vital Statistics was made by Dr. Bodine, on three points, as requested by the Council:

First.—The history of legislation in New Jersey on the subject of Vital Statistics.

Second.—A discussion of methods of obtaining these statistics in other States.

Third—Suggestions of improvements desirable or obtainable in the registration of these statistics in this State.

The paper recounted the various steps of legislation in the past. Reference was made to the methods adopted in Great Britain and in our country, chiefly in the States of Massachusetts and Michigan. As to improvements in our State methods, the writer doubted the practicability of the attempt, not because it

is not eminently desirable, but because the knowledge and appreciation of our citizens is not sufficient to secure intelligent legislation.

STATE WATER SUPPLY.

The report of the Committee on Water Supply was made by Prof. A. R. Leeds, of Stevens Institute, Hoboken. The report was divided into two parts. The first notices the various water basins or water sheds into which the State is divided. The Hackensack basin of about one hundred square miles; the Ramapo, one hundred and forty-eight; the Kingwood, one hundred and eight; and the Rockaway, one hundred and sixty-five, are examples. As a specimen of amount carried, the drainage of the Hackensack basin is fifty-two billions of gallons annually. The relation of these to the water supply of cities to manufacturers and to deposit of refuse was then traced, and the figures of L. B. Ward referred to as showing the bearing of all these upon health. As an instance, in making wool into fine cloth it passes through forty steps, in ten of which water is used, and some of the impurities are putrescible nitrogenous matters of the most dangerous kind. While manufacturies are to be aided water contamination must be carefully guarded. Our great water sheds end abruptly in alluvial levels. Those high up upon them think nature designed them for mill sites and to carry off sewage. Those lower down in the great cities want them both for water supply and for sewers. Besides the great forests of our mountains help to make ozone and good air but these are being rapidly removed. The report described the process by which the rain, the leaves and the atmosphere are at work in the great alembics of the hills, to distil pure water and pure air for the plains, and how this is disturbed, so that our crowded and populous cities toward tide water are robbed of the life forces. Malaria and confervoid growth takes the place of natural equilibrium and aeration and oxidation are disturbed. Sickness comes, but the scare goes over and the rivers cleanse themselves again in time for some chemist to assure the people that the water is good, and sewage does no harm. The paper then speaks of makeshifts for evils, such as the present plan of a dam across the Passaic at Belleville. It then refers to the hope

of an ultimate water supply derived directly from sources high up in these water basins, and to such utilization or disposal of sewage as will prevent the fouling of water courses. Reference is made to the annual report of the State Geologist of 1876, as giving a valuable summary of facts.

The second portion of the report examines in extenso the fish epidemic of the last Summer as affecting certain streams. All sorts of explanations were given of it, by the papers until finally it was attributed to the washing in of Paris green intended for the Colorado beetle. An interesting letter from the Fish Warden, J. C. Roe, attributed it to the low water and drought. Professor Leeds visited Paterson and made some examinations of the water. The low water and warm weather had produced large quantities of aquatic plants of a low order of vegetable life. After reviewing various opinions he presents the hypothesis that the mortality resulted from intense heat upon the river beds bare or slightly covered with water, and the rapid production of vegetable organisms more particularly spores, poisonous to fish life. Also by the organic impurities thus mingled with the water, the supply of dissolved oxygen in the water is diminished so as not to leave enough for the fish. The floating algæ on the surface would also interfere with æration. At the same time there would be an increase of foul gases inimical to life. Professor Leeds gives most prominence to the last or deoxidation theory. The condition of heat, dryness, etc., did not continue long enough to pollute the waters far below. Plant and fish life have much to do in aiding us in determining the state of the water supply. Disagreeable taste and odor are sometimes given to water for a time as especially by the odor of plants of the order *Nostochineæ*. Some interesting facts were given as to the tracing of various tastes and smells from plant-life or plant decay. Professor Cook exhibited a specimen of water thus affected, which was very disagreeable, to a plant of the wild turnip species, but not yet proven to be harmful. Various other plants were referred to as identified in giving peculiar odors in their decay, and some as producing bacteria. Questions of water pollution and purification are closely connected with all these points.

Professor Leeds then traced the improvements made in chemical analysis of waters, but deemed these not sufficient alone. A report as to one of the rivers of France shows how important a

closet was recommended for family use, and the benefits in health illustrated by cases.

The London and Paris sewer systems were noticed in detail, as well as the history of the sewers. The description of Victor Hugo of the old Paris sewer was given, and believed to be founded on fact. The sewers of London so stagnated the Thames that Franklin, one hundred years ago, inquired, "Does the water of the Thames return to the sea?" The present system, that of Bazalgette, secures the drainage both of rain-fall and house sewage, and is carried into the Thames twelve and a half miles below the city, and through reservoirs let out at a proper state of the tide. The benefits of sewers were illustrated by improved health rates, and the remark of Dr. Farr quoted, "That it is as certain that a high mortality can be reduced by hygienic appliances down to a certain limit, as it is that human life can be sacrificed."

The separation of drainage and sewerage and of animal excrement from all household sewage was advised.

The various plans of utilization and disposal of sewage were then noted, such as Filtration—simple subsidence—Irrigation, Downward Filtration and the Liernur or Pneumatic system. There must be more attention to utilizing excrement and where cess-wells are used they should be as tight as cisterns.

The Fourth Annual Meeting, at Stevens Institute, Hoboken, opened with an address by Prof. A. R. Leeds, Ph. D. He made a rapid survey of the progress of sanitary science, and insisted that most of the work could be better done by States than by the General Government. Vital statistics were claimed as the foundation stone of exact sanitary science, and the progress therefrom illustrated in detail by a review of the New York City methods. Our own system, as recently adopted, was highly commended—the importance of registration of disease urged. The relation of sanitary science to education was unfolded and detailed facts given as to the model method pursued at Amherst College. It is not a mere gymnastic system, but a professorship in which physical takes its place by the side of intellectual and moral instruction. The bearing of invention on sanitary science was illustrated by the effect which the electric light might have, on questions of heat or ventilation. The need of close sanitary

urveys was shown, and the survey of localities now being conucted under the patronage of this association warmly commended. Experiments upon the composition of the atmosphere of different localities were claimed as of great importance. In England the government has appointed Dr. Angus Smith as Air Inspector. In Glasgow a City Analyst has been recently appointed with this special duty. New York is already showing the effect of the sulphurous and nitrous vapors sent out from its myriad chimneys. In Philadelphia there is scarcely a house front which is not disfigured by some stain of magnesia and lime salts, a result in part due to the acid vapors in the atmosphere. Ozone is an important constituent of the atmosphere, but the percentage present is difficult of test. For many months past important experiments as to it have been in progress in the laboratory. We are seeking to make contributions toward a chemical climatology, which is greatly needed to supplement and assist meteorology, agriculture and the study of disease.

PHYSICAL TRAINING.

The next paper, by J. Madison Watson, A. M., treated of the ygienic relations of physical training in schools and colleges. He noted the excellent theories which obtained as to the need f developing the body with the mind, and the sad contrast in ractice, presented by modern methods of education. There nust be created a public sentiment for educational gymnastics. But when other difficulties are removed, the system of gymastics so carefully and ingeniously elaborated by the French nd the Germans, and usually employed in this country, inolving the use of fixed apparatus, presents many obstacles that ender its general adoption almost impossible. He did not conemn heavy gymnastics, especially when taught by a suitable nstructor. But we seem to have been formed less for bearing erculean burdens than for the vocations which require flexiility, poise, grace, ease, rapidity of muscular action and a genral diffusion of muscular vigor.

What has been necessary in order to render physical culture niversal, is an extensive and varied system of light gymnastics, oth with and without apparatus, well adapted to all places, ges and conditions of life. The primary office of school calis-

thenics is to beautify and strengthen the body by pleasurable exercises which shall develop, regulate and perfect its parts. It is mainly recreative, giving relief to the mind while gratifying the physical sense. It is to be sharply separated from care, brain-labor, ailments and disease. Hence, *first*—an essential element of success and such a natural, systematic and logical arrangement of the subject that each position, each class of movements shall suggest what is to follow without taxing the memory or other faculties situated in the cerebrum. *Second*—a simple, systematic and complete series of commands is essential. *Third*—the movements must have not only a determined form and order of execution, but a determined time, the rhythm or division of which shall be well established in the mind. Musical gymnastics and all modes of marking time should be used. There are six varieties in counting, five in recitation, and six in music and in phonetics. Vocal gymnastics, of which so little is known, either theoretically or practically by the masses, is transcendently interesting and important. During the use of light indoor gymnastics the air of a room can be changed without risk to the pupils. Gymnastics must never be used as a substitute for play. Do not attempt to suppress the animal energy and unharmed enjoyment of your vigorous child, be it boy or girl.

Educate highly, the higher the better, so that you educate symmetrically; but do not defeat the chief end of your noblest efforts by producing physical degeneracy.

The question of compulsory education, confined strictly to the intellectual faculties, is one of grave doubt; but our sanitary, material, and military interests imperatively demand the best system of physical training in all schools, and corrective institutions that are sustained, wholly or in part, by the State. The graduates of normal schools, and the public teachers, must be proficients in gymnastics and successful physical trainers of youth.

All schools, both public and private, by legal enactment, should be subjected to the ablest medical supervision.

Our ideal instructor of youth is one who most successfully prepares the student to satisfy, unaided, all the requirements of life; our ideal physician, one who so regulates inherited and other defects, and promotes the health of those under his prac-

ice, as most successfully to avoid the need of remedies for disease.

J. T. Hilton, City Surveyor of Paterson, then treated of the construction of sewers.

First of all, there must be study of each locality. In the size and shape of sewers we must be governed by the material of which they are made and the amount of liquid to be carried. The egg-shape is preferred, as the concentration of the water in the small space at the bottom prevents the accumulation of sedimentary deposits. As the country is subject to violent storms, the basis of one inch rain-fall per hour as the maximum fall, as given by English authorities, will not suffice where the sewers need to carry storm water.

None of the sewers we construct are of a less grade than two-tenths feet per one hundred. If we cannot get the required ten feet depth at this grade, we take less rather than get below this low gradient.

By a diagram a method of sub-drain was shown. The cost is but 12 per cent. additional. If more generally understood this would probably end the discussion as to the availability of the same conduit for sewerage and sub-drainage. Attention was called to an important improvement for tight joints in pipe sewers known as "Stanfords Patent Joint." It seems to afford a tight joint without the use of cement. What we want in construction is good material and workmanship, true grades and tight joints, with the sub-drainage separated from the main flow of the sewage. The subject of house and basin traps is discussed, the former meaning those between the main house pipes and the outside sewer, and the latter those of bowls, closets, etc. For the former, preference is given to traps without valves, with two apertures for ventilating pipes, which help the efficiency of the trap and ventilate the sewer. A perfect house trap will prevent obnoxious gas from passing beyond the cellar walls. Much depends upon the proper placing. Our great danger in basin traps is the siphoning of the water.

It is due to two causes, the lodging of solid matter in the trap and more frequently by a heavy draught of water passing through them and a possible suction from the main sewer, a vacuum is created which exhausts the water from the bend.

For the ventilation of sewers free openings into the streets

and house pipes, connecting with the sewers and extending t the roofs, are advocated.

Instances coming under his own observation are given wher sewer air was being directly driven into houses.

The paper of Professor H. B. Cornwall, on Springs, Wells an Cisterns, discusses the sources of water supply and how best t protect them from contamination. It does not admit of suc condensation as to be of service. Some of the more impo tant suggestions will appear in our report in another form. is due to all the authors of these various papers to say that th outline deals only with the conclusions of most practical utilit and omits the larger portion of papers, all of which are worth of preservation in their finished and original forms.

VETERINARY REPORT.

BY J. C. CORLIES, D. V. S.

The State Board of Health, in its effort to ameliorate the anitary condition and subserve the best interests of the tate, early foresaw the necessity and importance of including n their annual report the live stock of the State. With that bject in view an article appeared in the last regular issue, stating that as soon as it was possible a Veterinary Department ould be added to the Board, whose duty would be to carefully ook into the past and present sanitary condition of the live tock, and report upon the same. The importance of this step annot be over estimated. The suffering animal creation calls or aid, and to the skilled Veterinarian must we look for assistnce. Note first of all the fact that we have in the United tates, at the present writing, no less than—

Horses	10,500,000
Mules	1,700,000
Milch Cows	11,500,000
Cattle	19,250,000
Sheep	35,740,000
Swine	24,135,000
Making a sum total	102,825,000

These animals aggregate the vast sum of $1,696,620,750, to ay nothing of the great number of valuable dogs requiring edical attendance. When we consider the amount of wealth nvested in this shape, we must appreciate the laudable efforts ut forth, not only to ameliorate the sanitary condition of the ame, but to secure to our own State, through her live stock, a reat material interest.

VETERINARY SCIENCE.

There are at the present time less than two hundred skilled eterinarians practicing in the United States; one to every one

hundred and fourteen thousand one hundred and twenty-seven animals; and in our own State but three or four, with room for at least two hundred. In lieu of skilled talent, stock raisers are required to employ stablemen and quacks, who know little or nothing of the many diseases they are called upon to treat. To this fact may be attributed the low estimate in which the veterinary profession has been held in the past, and we are reluctantly compelled to acknowledge, is being held by the public still. What we need is more educated veterinarians distributed throughout the country, as the past has satisfactorily proven that skilled talent, though having many obstacles to overcome, is being felt and generally appreciated.

When we consider what has been and what may follow one of those terrible visitations, that have from time to time invaded European countries, in the form of pleuro-pneumonia, foot and mouth disease, rinderpest, anthrax fever, and many other contagious and infectious diseases, who are we to look to but the man skilled in the use of veterinary means and medicine. We are informed that during the last century in Europe no less than two hundred million animals died of rinderpest and foot and mouth disease. To veterinary science alone is due the fact that its opportunities for extension have been so largely checked. The English government wisely saw the importance of appointing skilled veterinarians as commissioners to look after their live stock interest. Should not we, the great American people, second to none in the number of our live stock, profit by their example, not knowing how soon the same scourge may visit our continent? It is not only a necessity but a duty devolving upon us to foster veterinary schools, and urge upon our young men seeking a professional education to embrace a favorable opportunity and be prepared to prevent fatal disease, and thereby become public benefactors.

Up to 1864, although abortive attempts had been made both in Massachusetts and Pennsylvania to establish veterinary schools, there had been no regular lectures delivered. At this time the New York College of Veterinary Surgeons commenced a regular course of lectures, with a full corps of professors, and with seven students attending. The institution continued to flourish up to 1874, when owing to internal dissensions the doors closed, and the College shared the fate of

ts predecessors. Soon after a part of the faculty, with Dr. Alexander Liautard at their head—he having in the meantime procured a suitable building—associated themselves together, procured a new charter, and brought into existence the American Veterinary College. Too much praise cannot be bestowed upon the members of that faculty for their laudable efforts, and Professor Liautard more especially, whose zeal and fidelity to veterinary science entitles him to rank as the father of veterinary medicine in America. A Frenchman, who graduated with honor at Alfort, France, in 1854, he came to this country in 1860, and was associated with the first efforts to give to our, his adopted, country that veterinary science and art of which she stood so much in need. He has continued ever since to work zealously and indefatigably, spending the best years of his life and much money for the promotion of veterinary science. To-day he has the proud satisfaction of witnessing the flattering result of his tireless efforts. Strange though it may appear that the two great English speaking nations owe whatever progress they have made in veterinary medicine to Frenchmen. England honors her Bell, and America her Liautard.

The importance of veterinary medicine is being felt all over the country. Agricultural societies, extensive stock raisers and others are becoming deeply interested, feeling that they cannot longer afford to risk their valuable herds to the frequently occurring epizootic and enzootic plagues that so often decimate their ranks, without some avilable means to combat their influence.

No branch of science presents a wider field and offers greater facilities for investigation and experimentation. Physiology yet in its infancy owes much of what it is to veterinarians and veterinary science. Experiments performed on the lower animals have been the direct means of adding greatly to our knowledge of that most important of all physical studies. An animal becoming unfit for further use may be utilized, and it should be the duty of the veterinarian to report the result of his researches to not only his own but the sister profession. Operative surgery likewise could receive a stimulus, and perhaps advance by first performing important operations on the lower animals, and reporting the results. The operation of tenotomy now being so generally employed, and with such happy results, was first performed on the horse, and there is no reason why other opera-

tions equally as important should not follow. It likewise offers excellent opportunities for the study of pathology and morbid processes, while our knowledge of the action of special remedies has been largely gleaned from their having been first administered to the lower animal. We feel it our duty to earnestly impress upon all veterinary practitioners the importance of utilizing these excellent opportunities by deep scientific research, and by so doing aid practical medicine and surgery as well as reflect credit on our profession.

SOME OF THE CHIEF EPIZOOTICS OF CATTLE.

The most prominent is pleuro-pneumonia. We find it first made its appearance in this country in Brooklyn, in 1843, and in New Jersey in 1846. Dr. Chas. Michner, who has given the subject careful attention says, "it first broke out in 1847, in the herd of Mr. Thomas Richardson, he first finding it among his imported stock, and knowing its malignancy, immediately resorted to occision, at a very great sacrifice, thereby stamping it out. Again, in the Summer of 1855, (six years before it made its appearance in Massachusetts,) J. L. Jacobus bought twenty head of cattle in New York, which he turned into pasture three miles from Chatham, N. J. In about three weeks, in going to look after the herd, he found two had died, and three more were very sick. The remaining fifteen did not develop the disease. At about the same time, Dr. Munn, of Chatham, N. J., purchased some cattle from an apparently healthy lot, which he yarded with his other stock, when the disease made its appearance among his other cows, some of which soon died. From Dr. Munn's herd the disease was communicated to that of Mr. Lunn, who also lost several animals. Mr. Abraham Johnson, living near Newark, also purchased some cattle in New York which developed the disease in a short time after he brought them to his farm."

Dr. Michner informs us it was on this farm the first scientific post-mortem examination was made, being conducted by Dr. C. C. Gryce, of New York, in the presence of several physicians.

In 1843 there came from Europe in a steamer, a cow kept for the purpose of supplying the passengers and crew with milk. Upon arrival, she was sold in Brooklyn, where she went into a stable

nong a number of other cows, some of which soon presented nmistakable signs of malignant pleuro-pneumonia. As they ere diposed of to the butcher the malady did not spread. 'hat case marks the advent of the disease in the United States. Ve are informed it made its advent into Camden county in 858, and into Gloucester, in 1859. At that time it was raging xtensively in Massachusetts. Mr. J. E. Hancock, of Burlington ounty, bought some cattle in Philadelphia, in 1861, which introduced the disease in his herd.

An outbreak occurred in Clinton, N. Y., in August of 1877. A Mr. Cramer bought a cow from a car load that came by rail from Ohio to New York, from whence she was shipped to Clinton. This cow soon sickened and died, and though no post-mortem was made, it was believed that she died of malignant pleuro-pneumonia. From that time the disease began to show itself. Out of J. C. Cramer's herd of forty-two head, twelve died, five got well under treatment, and fourteen were destroyed before they had time to develop the disease. The disease was communicated to cattle belonging to Michael French, by pasturing in a lot adjoining Mr. Cramer's, eight of which contracted the disease and four died. Several others likewise lost more or less at the time. It is believed that the disease has not been entirely eradicated, and is liable to break out at any time, notwithstanding energetic and severe measures were adopted.*

In 1873 it visited several farms in Burlington county, causing a loss of one hundred head, where it was introduced by cattle from Pennsylvania.

In 1871 it appeared in Ocean and Camden counties, causing great loss.

In 1872 it appeared in Essex and Union, where it decimated many herds, and where it has existed to a greater or less extent ever since. While the malady was raging so extensively in Massachusetts, the Legislature wisely passed an act providing for the appointment of a commission of three, with power to slaughter all affected cases, and cause all places where it had existed, to be disinfected, and the slaughtered animals to be appraised and paid for by an appropriation from the Legislature.

"The earliest traces of this malady seems to place it in Central Europe, but nothing definite is known of it till 1769. From

*See American Veterinary Review.

that date down to 1789 the malady appears to have been confined to the mountainous regions of Switzerland (Fleming) but the increased commercial relations of countries soon carried it to other districts. It invaded Prussia in 1802, and soon spread over North Germany, reaching Great Britain in 1841, and the United States (Brooklyn,) in 1843," New Jersey in 1846, and Boston in 1859.

Its character is that of a specific contagious disease, peculiar to the bovine race, and wherever it appears it causes an immense destruction of life. It usually appears as an epizootic or enzootic. It is thought that as a rule young and plethoric animals succumb to its ravages first. It may terminate in death, or partial recovery in favorable cases. Convalescence is slow, and the cough will last for a long time.

"The infecting principle of the disease is fixed and volatile, and exists in its greatest intensity in the air expired by the sick animals, and probably in the secretions and excretions, and the air may carry it a distance of three hundred feet. The vitality of the virus is very tenacious, often retaining its virulence for a period of one hundred days." The mode of infection is through the respiratory passages. The incubation period has not been settled. Some authorities say it may exist in the system in a latent form for six or seven months. Its mortality may be computed at fifty per cent.

SANITARY MEASURES.

Our object should be to adopt measures to prevent its spreading to districts where it has not appeared, and to eradicate it in localities where it has already manifested itself. When it has made its appearance, no pains should be spared to inform cattle owners of its presence, who should at once resort to every available means to prevent its further spread. The infected animals should be slaughtered and buried with due precaution, so as not to be unearthed by dogs. Animals suspected should be quarantined.

A good deal has been said about inoculation. This question we shall discuss at some future time. The operation consists in taking some of the serum from a diseased lung while in the first or febrile stage, (the animal being destroyed for the purpose,)

en make a small incision in the lower extremity of the tail, troduce a few drops of the serum and apply a bandage for a w days. If the operation is successful, in about a week to n days there will be observed a slight constitutional de- angement, with swelling of the tail at the point of incision. The only inconvenience following the operation is a loss of a portion of the tail in about ten per cent. of the cases operated on. Of all the diseases which infest the bovine species in this country this is the most to be dreaded. Too much importance cannot be attached to the necessity of guarding closely all thoroughfares by which it may enter a district. Occision and inoculation being the only means by which its spread may be arrested, it is incumbent on the Legislature to enact a law making it incumbent on stock raisers to have their animals examined by an expert, who should be appointed by some delegated authority, and who should be invested with power to exercise occision or inoculation, as the circumstances might demand, and by that means the malady could be kept in check. Next to pleuro-pneumonia, no other disease is so fatal or causes so much apprehension as

SPLENIC OR TEXAS FEVER.

It is an enzootic disease, the pathology of which is now well understood. That it is of an anthroid nature we have little doubt, and not of a malignant typhus or typhoid nature as has been claimed by some. It seems to be exclusively American, originating in Southern cattle, and transmitted to others by direct contact. In 1868 it led to serious trouble, and came near causing a suppression of cattle traffic between the Gulf and Northern States. The disease presented a decidedly striking difference from that which anthrax presents in Europe. A peculiar feature of the malady is that an animal may seem in perfect health at night and be found dead in the morning, the symptoms never being marked and causing but little apprehension. After death, and in making a post mortem examination the only marked pathological lesion is found in the spleen which is found swollen to three times its usual size and of a dark color, and usually with its capsule ruptured. When an animal becomes affected it will seek seclusion by keeping from the rest of the herd, become

stupid, suddenly fall down and die without a struggle. Decomposition quickly follows. The New York Commissioners' report of 1868 says, we have not heard of a single case in any animal that has not been in contact with Texas cattle, or their excrement. The affection is communicated through the medium of the excrement. Animals contracting it from Southern cattle do not communicate it to other natives. The virus appears to be eliminated from the system after a few weeks spent in a Northern climate. It has an incubative period of two weeks; though it may be extended to as many months. The winter is unfavorable to its development. That it is a source of serious apprehension is sustained by the fact that in 1872 the mortality in three Western States alone amounted to twenty thousand animals. As in pleura-pneumonia medicine proves almost inert, but much may be gained by a well regulated sanitary police. We occasionally see or hear of a case but to what extent it now exists we have no means of knowing.

APHTHOUS FEVER,

Known as foot and mouth disease, is a form of vesicular fever. It comes into this country from Canada, where it has been carried from diseased cattle brought from England. But little is known of its early history. It is an aphthous (or eruptive fever), epizootic and contagious, affecting the skin and mucous membrane of nearly all the domestic animals. We are, from our limited knowledge of its pathology, unable to account for its causation. It is characterized by an eruption of vesicles in the mouth, and interdigital spaces of the hoof. The thermometer indicates a rise of temperature, which may run up to 104° or 107° Fah. The animal refuses to eat, saliva falls from the mouth with grinding of the teeth. When the feet are affected the weight will be frequently changed from one to the other foot. With a short, jerking motion, the animal will stand for hours refusing to use the sore feet. When the mouth is affected there are seen on its lining membrane, gums and tongue, small white ulcers the size of a pea. When the udder is the principal seat of disease the vesicles are found grouped in clusters around the orifices of the teats. When recovery is about to take place it is not uncommon to see large patches of epidermis come away from the

mouth. The contagion of this disease is both fixed and floating. It has a latent period of from three to ten days. Its mortality is but trifling, as it readily responds to treatment. The disease exists in some of the Western countries, but to what extent is not known.

RINDERPEST.

Of all dreaded diseases to which the bovine race is subject none causes so much apprehension as the above, which is more familiarly termed in Europe *The Cattle Plague.* Fortunately it has not as yet made its appearance in this country; at least we may draw that conclusion from knowing its fatality and tendency to spread, feeling sure it could not stop at one or two cases. The only source from which we may expect it is through importation and too much care cannot be exercised in having all imported animals undergo a rigid quarantine for the full incubation period.

SPECIAL DISEASES.

Dr. J. V. Corlis, of Monmouth county, reports an unusual number of cases of parturient apoplexy for the year, with an increased mortality. Dr. J. C. Dustan, of Morristown, has also met with an unusual number of cases during the early spring and summer months, and states that the mortality has been much greater than formerly. In our own practice we have met with a number of cases, and think the fact may be attributed to the plethoric condition of the animals, as we have invariably found them carrying an abundance of flesh, and with the blood vessels engorged. We believe the trouble is greatly due to the high standard of feeding that milch cows are subjected to, as well as the mild winter, and would impress upon farmers the importance of seeing that breeding cattle get laxative food a short time previous to parturition, and what would be better to give them an occasional mild cathartic.

CATARRHAL FEVER,

Or hollow horn, is a malady of the spring months, and one that causes a deal of trouble among badly kept animals, but shows a falling off, probably owing to the genial weather of last winter.

HOVE.

We are in receipt of a number of communications from various parts of the State, informing us that a number of calves died from this malady. We usually find it prevalent where there is an abundance of red-top clover. Large quantities being taken into an empty stomach in the early morning while wet with dew, fermentation takes place, and a gas is generated which soon distends the rumen or first stomach to its utmost capacity. If the animal does not get immediate relief, death invariably follows. For such cases every farmer should be provided with a trocar and canula, and understand its use, as the delay in securing a veterinarian might prove fatal. We recommend the use of the trocar only in cases that will not respond to rapid exercise bi-carbonate of soda, ammonia, &c., freely given per mouth.

STRANGULUS FILARIA.

On October 24th, I was called to Morristown, to see a herd of calves, belonging to Mr. J. G. Foote, said to be ailing from an outbreak of pleuro-pneumonia. After carefully noting the symptoms, I had an intelligent history of the malady from Mr Foote. On August 10th and 19th, he bought two lots of calves out of a drove, which were said to have come from Sullivan county, N. Y. On the 24th, he bought another lot from a different drove, said to have come from either the northern part of this State, or across the line into Pennsylvania. They were turned into a rich timothy pasture together. On going among them September 10th, he found that many were coughing, and two had died.

When we made an examination we found nearly all of them suffering from a severe and irritable cough, and which seemed to come entirely from the lungs, and was accompanied by a peculiar grunting. The rumen in all of the affected cases was distended with food, and we found a very weak pulse of seventy six, respiration, sixty, and temperature of 106° Fahrenheit, with the visible mucous membranes very aenemic; the schneiderian membrane ulcerated, and with a slight discharge from the nose. The most remarkable feature of the case was that the animals continued to eat voraciously up to the time of death. Mr. Foote

aving kindly placed the herd at our disposal, we at once estroyed two of them. On making a post-mortem examination re found the bronchial tubes largely filled with a *filarial* leposit, which on close examination proved to be a parasite. Many having died and others fast approaching dissolution, we prevailed upon Mr. Foote to place some of the least affected under treatment and report the result, which he promised to do. A very interesting question arises whether both herds coming from different parts of the country brought the disease with them, or whether it was acquired by contact, or generated on the farm. The last does not appear probable, as I have since learned that other calves, purchased from the same drove, and owned miles away from Mr. Foote's farm, also developed the same malady. We shall continue our investigation and hope to arrive at some satisfactory conclusion. We will close our brief allusion to bovine diseases by insisting upon the necessity—

1st. Of Ports of Entry.—There is, at the present time, and has been for a number of years, quite a large commercial traffic in cattle between this country and Europe. Through that traffic can be traced the advent of pleuro-pneumonia to this continent, and who doubts but in a little while we will be made to realize in our midst that most dreaded of all animal plagues, rinderpest. Too much care cannot be exercised in trying to avoid it. There is no easier or better way than to have Ports of Entry. Two or three at most will be sufficient for each State. They should be guarded by a Veterinarian, with powers delegated, if necessary, to place all suspicious animals in a strict quarantine for the incubative period, and also to exercise occision when it may be deemed essential. By this means alone we can hope to obtain immunity.

2d. Of the Stamping out Process.—We believe power should be invested in some qualified person as State Inspector; to investigate all outbreaks that occur, and he be delegated with power to kill if necessary. The animals destroyed should be appraised, and the owner compensated by the State. The process of stamping out would soon be complete, and thousands of dollars saved to the State annually.

DISEASES OF HORSES.

There is perhaps no class of animals, except the human, that attracts such attention as the horse. Although this outline is only introductory, we feel we should briefly refer to a few of the many diseases to which he is liable.

EPIZOOTIC INFLUENZA.

From time immemorial this disease has continued to infect the equine race; ranging over more or less area, but generally in the form of enzootic. Until October, 1872, it did not assume a serious aspect. We quote from a report rendered by Professor Liautard to the State Board of Health of New York city:

"On the evening of October 21st only a few animals were affected, but on the morning of the 22d there was scarcely an animal of the equine species that was not affected. Horses, mules and even a zebra. More than twenty thousand were suffering in different degrees, and it became apparent that the disease was influenza of the catarrhal form, fortunately not serious or fatal."

The symptoms as presented were, with a few exceptional cases, rigors, febrile action, impaired appetite, sneezing, cough, nasal discharge, accelerated respiration, weak and compressable pulse, and dry fæces. The attack was very sudden; the animal would be apparently well in the evening and sick in the morning; there was an abundant discharge from the nose; the temperature per rectum was often as high as 105° Fah., loss of appetite being one of the premonitory symptoms, and the movements of the animal were feeble and staggering. The skin was dry and the hair dull and staring.

The duration of the mild form is from two to three weeks, after which the animal can resume work, though in a few cases the symptoms disappear in eight or ten days.

The most common complications were thoracic pleurisy and pneumonia, destroying a large number of animals. The nervous system was affected in a few cases, in the form of spinal meningitis; in these the result proved quite satisfactory."

Influenza being debilitating in its nature, the animals which succumbed to the disease, did so from exhaustion, induced by the excessive work to which they were subjected, or from complications. Occasionally a relapse would occur, due to unfavorable atmospheric changes.

TREATMENT.

This is very simple, requiring merely close attention to the hygiene and diet, which should consist principally of laxatives, nutritious food, combined with vegetable tonics. But where complications follow, such as purpura, hæmorrhagica, adenitis, cerebro spinal meningitis, &c., the services of the veterinarian are required.

GLANDERS OR FARCY

Are widely diffused diseases, and it is questionable if there is a country on the face of the globe where it does not exist in a greater or less degree. Fleming says "that the designation, glanders and farcy, are employed to distinguish two forms of one disease, and that they are two diseases essentially identical, however dissimilar their external manifestations." The term glanders is applied where the disease affects the nasal, respiratory mucous membranes, lymphatic glands and lungs. Farcy, when it affects the skin and sub-cutaneous connective tissue. This fact has been demonstrated by inoculation, as the form of the disease does not depend at all upon the source from which the virus may be taken; for illustration, a subject may be inoculated with virus taken from a case of farcy, and a case of glanders will be induced, with the characteristic glandular enlargment and ulcerated mucous membranes, and *vice versa*.

A good deal of controversy has from time to time been indulged in as to its origin; some authorities claiming it is induced only by inoculation, while others are equally as positive it has spontaneous origin. We coincide with the latter view.

There are several cases on record where a number of animals have during a long, cold, wet spell of weather suddenly developed the malady in all its virulence, when to all appearances the animals were prior to it in excellent health. Owing to the

vitality of the virus, too much care cannot be exercised in thoroughly cleansing and disinfecting all places where glanderous animals may have been kept, it being important that another animal should not occupy the stall or box for the period of six months afterward. All suspected cases should at once be examined by a competent person and if found suffering from the malady, destroyed without delay, and their bodies buried deeply, as all animals are liable to contract the disease, and dogs especially.

The disease is one that should be handled with extreme caution. We cannot undertake to give all the characteristic changes and symptoms so essential to be known in order to detect the malady in the brief space allotted us.

It has been ably discoursed upon in a number of excellent works, which are easily procured.

From the frequency in which we meet with cases, we may draw the conclusion that it prevails to a greater or less extent in all parts of the country. Scarcely a week passes that we are not called upon to see one or more cases, in which we feel it our duty to order occision. We are in communication with a number of practitioners from various parts of the State, who inform us that it has grown to be quite common in their practice. This with other reasons inclines us to believe that it is on the increase, and so long as unscrupulous dealers are allowed to dispose of infected animals with impunity, we cannot expect a different state of affairs.

A law such as has recently been passed in New York, making it a misdemeanor, and punishable with a fine and imprisonment for any person who shall dispose of an animal suffering with glanders, would have a salutary effect in our State.

Dr. Dutan, of Morristown, reports the appearance of an enzootic in Madison, N. J., last Spring, where a number of cases died of a disease resembling diphtheria in the human subject.

A consulting veterinarian surgeon from New York, an excellent authority, differed in his diagnosis, and thought it resembled cerebro spinal-meningitis under a slightly changed form. Not having an opportunity to see enough of the cases we are not prepared to discuss the subject, though we are inclined to think it might have been anthroid angina.

Dr. J. C. Force reports an unusual number of cases of angina

f a mild form, and readily yielding to treatment. Our attention having been called in New Brunswick, Paterson, Princeton, Boselle and Raritan, in our professional capacity to examine what was believed to be a form of influenza. We had little or no difficulty in detecting glanders, and caused a number of cases to be destroyed.

TYPHOID INFLUENZA.

Has been more or less prevalent in and about Newark, N. J., for the last year, and quite a number of cases have died from its effects. We may account for the great number of cases presenting typhoid characters, from the fact that many stables are so constructed that the urine, with other drainage, often lies directly under the animal.

Fermentation is set up and they are compelled to breathe an atmosphere loaded with effluvium; hence the disease. We would endeavor to impress upon horse owners the importance of raising the flooring of such stables, and thoroughly cleaning and disinfecting that part. We feel satisfied the result gained would amply repay the time and trouble. Other diseases and those of other animals will be more fully treated at another time.

Report on Interrupted Water Supply.

Report of the Committee appointed by the New Jersey State oard of Health as to an alleged nuisance at New Village, Varren county, pursuant to a petition herewith attached:

Having visited New Village on January 3rd, 1878, find it conains thirty-four families, one school, two blacksmith shops, one achine shop, one wheelwright shop, one store, one shoe shop, ne hotel, and about two hundred inhabitants. The conditions ow and formerly of the water supply to said village, together s to the alleged nuisance, are as follows, viz:

1st. Prior to 1831 the village was supplied with water by eans of a good sized mountain brook running through it, well igging being impracticable, as water could not be obtained om that source.

2nd. In 1831 the Morris Canal was constructed at the base of he mountains across the brook supplying the village with water, he Canal Company placing a tube of four inches in diameter nder the canal for the purpose of giving the necessary supply. The village *at that time*, contained only six or seven famiies and no business places. The balance of water went into the anal.

3rd. In 1845 the canal was enlarged, by which operation the our inch tube became clogged and partially stopped. The citiens of the village could not get any satisfaction from the Canal Company, and the suffering was so great that a number of persons ent in the night and dug the canal through, giving them all he original brook, in which act it does seem as if they were lmost justifiable. Afterwards on account of the increase of inhabitants, the Canal Company in addition to the four inch ube, put in a two inch lead pipe, but for some time the four nch tube has been completely clogged, no water going through t, and the two inch pipe partially, so that in dry times no water t all gets to the village, and when it does get there is so impure hat cattle will not drink it, the sanitary effect of which can

easily be understood; *i. e.*, the suffering of the inhabitants from sickness and distress from that cause for the past two years has been serious. The head of the two inch pipe had just been cleared when we saw it, but we understand that since that time it has become clogged.

The whole fixture of the two-inch pipe is of the most temporary character—has the appearance of having been placed in by unskilled labor—taking water from the canal instead of from the brook, and arranged in such a manner that it is constantly subject to stoppage. It is certainly surprising that such an arrangement exists when the expense would be trifling and very little skill is required to make a permanent and complete arrangement by taking the water from the brook laterally and above level of the canal, giving a six inch diameter pipe, which would need but little attention afterwards, and give an abundant supply of pure and wholesome water to the village for years to come.

The canal company, in 1831, considered a tube of four inches diameter necessary to supply six or seven families, and now when there are thirty-four families and a number of business places, it undertakes to give the needed supply through a two-inch pipe, and that clogged up part of the time. The cutting off of water from this village seems to be an outrage and nuisance which should be brought properly before the canal company and abated at once.

This case seems to call for an expression from this Board, and we would add that in all cases (especially when it is used for drinking purposes,) when the supply is interfered with, or polluted so as to endanger the health of a community, there should be some way of remedying the evil by summary process, and when the nuisance is permitted, or committed by any corporation, it should be abated by the Board of Health in such place, and the charges and costs be made a preferred lien over any other existing indebtedness. When a whole community is suffering from the neglect or carelessness of an incorporation it should certainly be reached in a shorter manner than the tedious process of the present law. We would therefore recommend the attention of the Committee on Legislation to this subject.

All of which is respectfully submitted,

THEODORE R. VARICK,
EZRA A. OSBORN.

METEOROLOGICAL RECORDS.

. 1.—Showing Mean Temperature at Cape May, N. J., for 1878. Latitude, 38° 56′; Longitude, 74° 58′.

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
.....	30.7	33.5	41.7	48.2	61.0	56.0	73.2	74.0	78.2	67.2	45.	48.
.....	38.5	32,	48.7	49.7	64.5	57.5	73.2	75.0	79.	69.7	53.5	54.7
.....	21.2	29	50.5	49.5	65.0	61.5	74.0	75.7	77.2	69.7	43.5	47.
.....	40.2	31.	40.2	46.2	64.7	64.7	74.7	75.2	74.7	67.2	41.	47.2
.....	28.7	35.2	42.	50.7	59.0	67.0	77.7	75.2	73.7	61.0	43.7	37.
.....	26.5	39.2	49.7	50.5	62.0	61.7	76.0	75.2	72.5	61.7	53.	47.
.....	20.0	46.	54.5	50.5	62.5	62.0	76.7	74.5	71.0	57.7	42.	38.
.....	31.5	50.5	52.5	52.5	67.0	64.2	75.2	75.5	67.7	62.5	40.7	38.
.....	42.2	49.2	50.2	51.5	62.7	66.5	76.0	79.0	68.7	71.5	41.5	49.5
.....	44.2	43.2	51.7	55.	61.2	64.7	76.2	77.7	74.2	60.5	47.5	49.5
.....	41.0	32.5	52.2	55.7	52.2	60.2	77.7	72.0	73.2	59.0	52.2	42.2
.....	39.5	37.5	45.7	55.5	51.2	63.7	72.7	73.2	75.5	58.5	52.	39.5
.....	43.7	41.7	51.2	54.7	51.2	64.5	73.7	73.2	74.7	58.5	58.	36.7
.....	44.	39.2	47.7	56.	50.0	66.5	73.7	75.0	68.0	64.7	41.	41.2
.....	39.2	38.2	45.	52.	46.0	67.0	79.0	72.2	67.0	65.0	42.5	40.2
.....	31.2	41.7	48.2	47.5	55.0	67.2	73.5	71.7	66.0	67.5	57.5	30.7
.....	38.7	46.	45.7	49.5	56.5	73.0	73.5	72.5	68.2	67.5	57.5	32.
.....	40.5	35.7	45.2	52.2	57.7	65.5	79.5	76.2	73.7	53.0	48.	34.5
.....	45.5	31.5	49.	55.	61.5	68.0	81.7	76.0	75.5	51.7	55.5	30.5
.....	48.7	45.2	47.7	59.5	56.7	70.5	78.7	75.7	74.5	55.7	49.2	29.7
.....	46.5	49.7	46.7	63.	65.2	76.5	77.5	71.5	75.7	59.7	53.7	43.
.....	45.	51.	48.5	59.5	59.7	70.2	74.7	69.7	63.2	62.5	57.7	38.2
.....	29.	49.7	51.7	64.5	62.0	68.2	76.0	66.5	64.0	63.5	44.2	27.5
.....	34.2	41.7	44.7	60.7	62.5	72.0	77.7	71.2	70.5	55.5	50.0	25.
.....	46.7	39.7	30.5	58.2	65.0	72.7	74.7	70.5	70.7	53.2	54.7	22.2
.....	46.5	38.2	41.7	60.5	67.2	76.5	73.7	70.2	70.5	56.7	42.	29.7
.....	46.5	44.	53.2	59.7	67.7	76,7	76.0	72.0	57.0	61.7	52.7	25.5
.....	35.2	46.7	53.7	59.2	60.2	77.2	77.2	73.5	55.0	44.7	45.7	26.2
.....	28.0	.....	46.7	59.7	66.5	75.5	74.2	73.5	65.0	47.7	45.2	28.
.....	30.8	.....	48.2	59.5	63.7	74.5	72.5	74.7	62.7	59.5	42.5	32.
.....	42.2	.....	47.5	.....	55.2	.....	71.5	75.5	.....	46.5	.....	29 7

No. 2.—Barometer reduced to 32° at Cape May, N. J., for 1

Days.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.
1.....	29.85	29.81	30.43	29.76	29.98	29.09	30.09	29.90	30.059	30.113	30.17
2.....	29.89	30.22	30.07	28.78	29.80	29.99	30.08	29.78	30.032	30.001	30.10
3.....	30.39	30.23	29.40	29.80	29.86	29.99	30.13	29.84	29.960	30.03	30.26
4.....	29.75	29.94	29 74	29.43	29.82	29.94	30.09	29.88	29.935	30.028	30.22
5.....	29.44	30.07	30.31	29.32	29.75	29.95	29.92	29.91	29.956	30.035	30.27
6.....	30 18	30.26	30.24	29.30	29.86	30.05	29.97	29.78	30.093	30.139	29.90
7.....	30.51	30.11	30.06	29.71	29.91	29.96	30.04	29.86	30.29	30.24	29.87
8.....	30.72	29.52	30.39	30.63	29.78	29.62	30.02	29.91	30.285	30.227	29.71
9.....	30.38	29.60	30.47	30.23	29.88	29.74	30.03	29.71	30.176	29.984	29.98
10.....	29.63	29.51	30.24	28.98	29.93	29.00	30.08	29.83	30.049	30.047	29.98
11.....	29.65	29.87	30.10	29.64	29.94	29.84	30.17	29.91	30.033	29.934	29.75
12.....	30.17	30.04	29.88	29.61	30.01	30.03	30.09	29.96	29.94	29.895	29.72
13.....	30.16	29.98	29.72	29.72	30.05	30.14	30.02	29.98	29.863	30.123	29.97
14.....	29.71	29.95	29.87	29.86	30.04	30.18	29.94	29.96	30.109	30.206	30.40
15.....	29.68	29.99	30.08	29.99	29.92	30.08	29.95	30.11	30.207	30.153	30.40
16.....	30.18	30.04	30.05	30.16	30.00	30.00	30.08	30.17	30.27	30.141	30.35
17.....	30.24	29.92	29.80	30.22	30.08	29.95	30.00	30.08	30.241	30.023	30.08
18.....	30.33	30.02	29.95	30.26	30.19	29.91	29.89	29.93	30.160	29.731	29.97
19.....	30.30	30.28	29.90	30.04	30.24	29.91	29.86	29.78	30.120	29.851	29.95
20.....	30.07	30.08	30.03	29.84	30.10	29.87	29.90	29.74	30.033	30.129	29.82
21.....	29.85	29.94	30.17	29.80	29.96	29.79	29.98	29.83	29.987	30.222	29.78
22.....	29.80	29.61	30.17	30.03	30.08	29.72	29.79	30.03	30.282	30.026	29.94
23.....	30.12	29.76	29.76	29.98	30.09	29.91	30.03	30.17	30.392	29.499	29.57
24.....	30.45	29.95	29.41	29.90	29.97	29.92	30.07	30.06	30.247	30.132	29.89
25.....	30.31	29.99	29.90	29.74	29.83	29.96	29.96	29.80	30.204	30.314	29.91
26.....	30.06	30.11	30.05	29.77	29.67	30.06	29.81	29.97	30.166	30.324	30.22
27.....	30.00	30.11	29.81	29.84	29.80	30.11	29.85	29.95	30.364	30.074	29.72
28.....	29.77	30.06	29.62	29.72	29.88	30.12	30.08	29.98	30.363	30.214	29.82
29.....	30.25	.....	29.94	29.74	30.03	30.10	30.05	30.06	30.256	30.189	30.21
30.....	30.42	.....	30.14	29.89	29.93	30.11	29.90	30.14	30.191	29.824	30.34
31.....	29.66	.....	29.80	.....	29.91	.....	29.99	30.14	.....	29.813	.....
	30.370	29.97	29.99	29.84	29.95	29.95	29.98	29.94	30.143	30.054	29.99

). 3.—Inches of Rain and Melted Snow for 1878, at Cape May, New Jersey.

Days.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1		.05 *				.55 .70			.13			
2						.05 .03						.95
3			.05			.01						
4	1.24								.80			.13 .09
5			*		1.30				.02			.01
6												
7			.02							.05	.04	
8	*				.02	.15 .01						
9				.02	.02	.06	.02					.02 .02
10	.99	.22 .20		.40		.15 .50			.08			2.31
11	.14		.04 .03	.02 .08		.10				.04		.22
12			.73	.30 .02		.01	.04 .73				.22	
13			.75 Th.05		.32	.08	.07		.03 .11			
14	.13		.15									
15					2.71							
16				.01								1.44
17		.06	.48		.12						.03	
18		.03				.62				.10 .36	.37	
19							.01					
20	.21			.04	.50						.20	
21				.02	.30		.25					1.74
22	.01	.07				1.05					.35	
23										2.28		
24			.08									
25	.01			.70								
26	.16				.10				.16			
27	.02										1.90	.05
28	.02		.35	.02							.06	
29				.03								
30					.71		.52 .79			.14		.02
31	2.09		.82 .01		.01					.41		
	5.02	.63	3.61	2.06	6.11	4.07	2.43	6.41	1.33	3.38	3.17	7.00

* Too small to measure.

No. 4.—Direction of Wind at Cape May, N. J., 1878.

DATE.	JANUARY.			FEBRUARY.			MARCH.		
	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.
1	N. W.	N. W.	N. W.	W. 6	N. W. 4	N. 2	N. 2	E. 4	E. 2
2	N. W.	S.	W.	N. 2	N. 2	N. 2	S. E. 2	S. E. 2	S. 6
3	N. W.	N. W.	N. E.	N. 2	N. 2	N. W. 2	S. 4	S. 4	S. 2
4	E.	S.	W.	N. 2	N. W. 4	N. W. 4	W. 6	S. W. 6	N. W. 6
5	W.	W.	W.	N. 4	N. 4	N. W. 4	N. W. 4	N. W. 4	S. 2
6	W.	W.	W.	N. W. 4	N. W. 2	S. W. 2	S. 4	S. 4	S. 4
7	N. W.	N. W.	N. W.	S. W. 4	S. 4	S. E. 2	S. W. 4	S. W. 4	N. W. 4
8	N.	S.		S. E. 4	S. E. 2	S. 4	N. E. 2	S. 2	S. 2
9	N. E.	N. E.	E.	S. W. 4	N. W. 2	S. E. 2	E. 2	S. E. 2	S. E. 2
10	E.	N. E.	N. W.	S. W. 4	N. W. 2	W. 2	E. 2	S. E. 2	S. 2
11	W.	W.	W.	N. W. 6	N. W. 6	N. 4	S. 2	S. 2	N. E. 2
12	W.	W.	W.	N. 4	S. W. 2	S. 6	N. E. 4	N. E. 4	N. E. 4
13	N.	E.	E.	W. 2	S. W. 2	E. 2	W. 2	S. W. 2	S. W. 4
14	S. W.	S. W.	S. W.	E. 4	E. 4	E. 4	S. W. 4	W. 6	N. W. 4
15	W.	N. W.	N. W.	N. E. 2	E. 4	E. 2	N. 4	N. W. 4	N. W. 2
16	N. W.	N. W.	N.	N. 2	S. 2	S. W. 4	N. 2	S. 2	S. E. 2
17	N. E.	S. E.	S.	S. W. 4	S. 4	S. 4	S. E. 4	N. W. 4	N. 4
18	N.	E.	E.	N. 4	N. 4	N. 6	N. W. 6	N. 4	S. 4
19	E.	S. E.	S. E.	N. 4	N. W. 2	S. 4	N. W. 4	N. W. 2	N. W. 2
20	S. E.	S. E.	S. E.	S. 6	S. 4	S. 4	N. W. 2	N. W. 6	N. W. 4
21	N. W.	S. E.	N. W.	S. 4	S. 4	S. 4	E. 2	S. 2	S. 2
22	W.	W.	W.	S. E. 4	S. 4	S. 4	N. E. 2	S. E. 2	S. 4
23	W.	W.	N. W.	.....	E. 2	N. 2	S. W. 4	S. 6	S. 4
24	N. W.	S. E.	S.	N. W. 4	N. W. 4	N. W. 2	S. 4	W. 4	N. W. 4
25	S.	S.	S.	N. 4	N. W. 4	W. 6	N. W. 6	N. W. 6	W. 4
26	W.	W.	N.	N. W. 8	N. W. 8	N. W. 4	N. W. 6	N. W. 2	S. W. 2
27	.....	S. E.	S.	N. W. 6	N. W. 4	S. W. 2	S. 4	S. 2	S. 4
28	W.	N. W.	N.	W. 2	N. W. 2	S. 2	S. 4	S. 4	S. 4
29	N.	N.	N.	.....	.....	.....	N. 6	N. W. 4	N. 4
30	N.	E.	E.	.....	.....	.....	N. 4	S. E. 2	S. 4
31	S. E.	E.	N. E.	.....	.....	.....	E. 2	E. 2	S. W. 2

No. 4.—(Continued.)

DATE.	APRIL.			MAY.			JUNE.		
	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.
1	W. 4	N. W. 4	N. W. 2	E. 2	S. 2	S. 2	N. E. 4	N. E. 4	N.
2	N. W. 4	N. W. 2	W. 2	W. 2	S. E. 2	S. 4	N. E. 4	N. E. 2	N.
3	E. 2	S. E. 2	S. E. 2	S. 2	S. 4	S. 4	N. E. 2	E. 2	
4	N. E. 2	N. E. 4	N. 2	S. 4	S. 4	S. 4	S. E. 2	S. E. 2	S.
5	N. W. 6	N. W. 4	W. 4	S. 4	W. 4	W. 2	W. 2	N. W. 2	
6	N. W. 4	W. 2	W. 4	N. W. 2	N. W. 2	N. W. 2	N. 4	N. W. 4	N.
7	N. W. 6	N. W. 4	N. W. 2	S. W. 2	S. 4	S. 2	N. E. 2	S. E. 2	S.
8	N. W. 4	N. W. 2	N. 2	N. W. 2	N. 2	E. 2	S. E. 2	S. 4	
9	E. 2	S. E. 4	S. E. 2	S. E. 2	N. 2	E. 2	W. 4	N. W. 2	S.
10	S. E. 2	S. E. 4	S. E. 2	N. 2	S. W. 2	N. W. 4	S. 4	N. 2	
11	N. E. 2	N. W. 2	S. W. 2	N. W. 4	N. W. 4	N. W. 6	N. 4	N. W. 2	S.
12	N. W. 4	W. 4	W. 2	N. W. 4	S. W. 4	S. W. 2	N. W. 4	N. W. 2	
13	W. 4	N. W. 4	N. W. 2	N. 4	N. W. 2	N. 2	N. W. 2	N. W. 2	S.
14	N. W. 2	N. W. 2	W. 2	E. 2	E. 2	E. 2	N. 2	N. 2	
15	E. 2	E. 2	E. 2	N. E. 6	N. E. 4	N. 2	N. W. 2	S. 2	
16	E. 2	E. 2	N. E. 2	N. 6	N. W. 2	S. W. 2	S. W. 2	S. 4	
17	N. E. 2	E. 2	E. 2	S. W. 2	S. 4	S. E. 2	S. 4	S. 2	
18	N. E. 2	S. E. 2	S. E. 2	N. E. 2	S. E. 2	S. E. 2	S. W. 2	S. 2	
19	W. 2	S. 2	S. 2	S. W. 2	S. E. 2	S. E. 2	N.	S. E.	
20	S. 2	S. 2	S. 2	S. E. 2	S. E. 2	S. W. 4	W. 4	N. W. 2	
21	W. 2	W. 2	N. W. 2	S. W. 2	S. 4	S. W. 2	E. 2	S. 2	S. E. 2
22	S. E. 2	S. E. 2	S. E. 4	N. 4	N. W. 4	N. W. 2	S. E. 2	S. 2	N. W. 2
23	S. E. 2	E. 2	S. 4	N. 4	N. W. 2	N. W. 2	W. 4	W. 2	W. 2
24	S. 2	S. 6	S. 4	N. 2	S. E. 2	S. E. 2	W. 2	W. 2	S. W. 2
25	S. 2	S. 2	S. E. 2	S. 2	S. 2	W. 2	W. 2	N. W. 2	S.
26	S. E. 2	S. E. 2	S. 4	S. 2	W. 2	W. 2	W. 2	S. 2	W.
27	S. E. 2	S. E. 2	S. 2	W. 2	N. W. 2	S. 2	W. 2	S. 2	S. 2
28	N. E. 2	E. 2	E. 2	W. 2	N. W. 2	W. 2	N. W. 2	W. 2	S. E. 2
29	S. 2	S. E. 2	S. 2	N. E. 2	N. 2	S. W. 2	N. W. 2	S. 2	S. E. 2
30	S. E. 2	E. 2	E. 2	S. E. 2	S. 2	N. 2	E. 2	S. E. 2	S. E. 2
31	.....	.....	.....	N. 4	N. 4	N. E. 4	.....	.....	.....

Figures along side denote as follows: Breeze, (2); strong wind, (4); gale, (6); violent gale, (8); tornado, (10).

No. 4.—(Continued.)

DATE.	JULY.			AUGUST.			SEPTEMBER.		
	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.
1	E. 2	S. E. 2	S. E. 2	E. 2	S. E. 2	E. 2	S. 2	S. E. 2	S. 2
2	S E. 2	S. E. 2	S. 2	W. 2	N. W. 2	S. 2	S. 2	S. 2	S. 2
3	S. 2	S. 2	S. 2	N. W. 2	W. 2	S. 2	S. E.	S. E. 2	S. 2
4	S. 2	S. 2	S. 2	S. 2	S. 2	S. 2	S.	S.	N. W. 2
5	W. 2	N. W. 2	E. 2	S. E. 2	S. E. 2	S. E. 2	N.	N. W. 2	N. W. 2
6	N. E. 2	S. E. 2	S. 2	S. E. 2	S. E. 2	N. 4	N.	E. 2	E. 2
7	S. 2	S. E. 2	S. E. 2	W. 2	N. W. 2	S. 2	S. W. 2	N. E. 4	N. E. 2
8	S. E. 2	S.	S. 2	N. W. 2	S. 2	S. 2	N. E.	E. 4	N. E. 2
9	S.	S.	N. W. 2	S.	S. 2	S. 2	S. W. 2	N. E. 2	N. E. 2
10	S.	S.	S. 2	N. E. 2	S. E. 2	S. 2	N. E.	E. 2	E. 2
11	E.	E. 2	S. E. 2	W. 2	S. W. 2	S. W. 2	N. E.	E.	N. E. 2
12	E.	S. E. 2	S. E. 2	N. 2	N. W. 2	S. 2	E.	E. 4	E. 4
13	N.	N. E. 2	S. E. 2	S. E. 2	S. E. 2	E. 2	S. E.	S. 4	W. 4
14	W.	S. W. 2	S. E. 2	E. 2	S. E. 2	E. 2	N.	N. W. 2	W. 4
15	N. E.	S. E. 2	S. 2	S. 2	S. 2	S. 2	N.	N. W. 4	N. 2
16	S. E.	S. E. 2	S. 2	S. E.	S. 2	S. 4	N. E.	E.	E. 2
17	S.	S.	S. 4	S. E.	S. 2	S. 4	S. W.	S. W. 2	S. 2
18	S. W. 2	S. 4	S. 2	N. W. 2	N. W. 2	N. W. 2	W.	S. E. 2	S. W. 2
19	S. W. 2	S. 4	S. 2	N. W. 2	N. W. 2	N. W.	S. 4	S. 4	S. 4
20	S. 4	S. 4	S. 2	N. 4	N. W. 4	N. W.	S. 4	S. W. 4	S. W. 2
21	N. W. 4	W. 2	N. 2	N. E. 2	N. E. 2	E. 2	N. 4	N. 4	N. E. 2
22	N. W. 4	W. 2	W. 2	N. E. 2	N. E. 2	E. 2	E. 2	E. 2	S. E. 2
23	S. 2	S. 2	S. 2	E. 2	E. 2	E. 2	N. E.	N. E.	S. E. 2
24	S. W. 2	S. 4	S. 4	S. 4	N. W. 4	N. 2	S. E. 2	S. E. 2	S. E. 2
25	S. 4	S. 4	S. 4	N. 2	S. E. 2	E. 2	N. E. 2	N. E. 2	N. E. 2
26	S. 4	W. 2	S. 2	S. 2	S. 2	S. 2	S. W.	N.	N. 2
27	N. E. 2	S. E. 2	S. E. 2	E. 2	S. E. 2	E. 2	N. 4	N. E. 2	N. E. 2
28	S. E. 2	S. E. 2	S. E. 2	E. 2	S. E. 2	E. 2	E. 2	E. 2	E. 2
29	S. W. 2	S.	N. 2	E. 2	S. E. 2	E. 2	E.	S. E. 2	E. 2
30	N. E. 2	S. E. 2	E. 2	S. E. 2	S. E. 2	E. 2	N. E. 2	N. E. 2	N. E. 2

No. 4.—(Concluded.)

DATE.	OCTOBER.			NOVEMBER.			DECEMBER.		
	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.
1	N. E. 2	E. 2	E. 2	N. W. 8	W. 4	S. W. 4	N. E. 2	E. 2	E. 4
2		S. E. 2	S. 2	S. W. 6	S. W. 2	S. W. 4	S. E. 6	S. W. 4	W. 4
3		N. W. 2	S. E. 2	N. 4	N. 4	N. 2	W. 4	W. 4	S. 4
4	N. 2	N. W. 2	N. 2	N. W. 2	N. W. 4	N. W. 2	W. 4	W. 2	N. W. 4
5	N. 4	N. W. 2	S. E. 2	N. W. 4	N. W. 4	W. 4	N. W. 6	N. W. 6	N. W. 6
6	N. W. 4	N. W. 2	N. 4	S. W. 4	S. W. 4	N. W. 2	W. 4	W. 6	N. W. 4
7	N. E. 2	S.	S. W. 2	N. 2	N. 2	W. 4	W. 4	N. W. 4	N. W. 4
8	N. W. 2	W. 2	S. 2	W. 6	N. W. 6	N. 6	N. 2	N. 2	S. E. 2
9	S. 4	S. W. 6	S. W. 6	N. W. 6	N. W. 6	N. W. 6	S. E. 2	S. E. 4	S. E. 4
10	N.	N. W. 4	N. 2	W. 6	N. W. 4	N. W. 2	S. E. 6	S. W. 4	S. W. 6
11	N. E.	N. E. 4	N. E. 4	E. 2	S. 2	S. 4	W. 6	W. 6	W. 2
12	N.	N. 6	N. 6	S. W. 2	N. W. 4	N. W. 2	N. W. 4	N. W. 4	N. 4
13	N.	N. 4	N. W. 2	N. 2	N. 4	N. W. 4	N. W. 4	N. W. 4	N. W. 2
14	N. W.	S. E. 2	S. 4	N. 4	N. W. 2	N. E. 2	N. E. 2	S. E. 2	S. 4
15	S.	S. 4	S. 4	N. 2	E. 2	E. 2	S. W. 2	N. 2	N. W. 4
16	S. 4	S. W. 4	S. 4	N. E. 2	E. 2	N. E. 2	W. 6	N. W. 6	N. E. 2
17	S. 4	S. 4	S. 4	E. 2	S. E. 2	S. E. 2	N. E. 2	N. W. 2	N. W. 2
18	N. W. 4	N. 4	N. W. 6	E. 2	N. 4	N. 4	N. W. 2	W. 4	N. W. 4
19	W. 6	N. W. 4	W. 6	N. W. 2	N. 2	S. E. 2	N. W. 2	N. W. 4	N. W. 4
20	N. W. 6	W. 4	S. W. 4	N. W. 2	N. E. 2	S. 2	N. W. 4	N. W. 2	W. 2
21	S. W. 2	S. 2	S. 4	S. E. 2	S. E. 2	E. 4	S. E. 2	S. E. 6	S. 4
22	S. 2	S. E. 2	E. 4	N. E. 2	S. 4	S. W. 4	W. 6	W. 6	S. W. 4
23	E. 8	S. W. 4	N. W. 4	W. 8	W. 8	W. 6	W. 6	W. 6	S. W. 4
24	N. W. 6	N. W. 6	N. W. 4	W. 4	S. 2	S. 2	N. W. 6	W. 6	W. 6
25	N. 4	S. E. 2	.....	S. 2	S. W. 2	S. 4	W. 6	N. W. 6	N. W. 6
26	.....	S. 2	S. 4	N. 4	N. 2	N. 4	N. W. 4	W. 4	.....
27	S. 4	S. 4	S. 4	E. 4	S. E. 4	S. W. 6	N. 4	N. W. 6	N. W. 6
28	N. W. 6	N. W. 4	N. 2	W. 4	W. 6	W. 6	W. 4	N. W. 6	N. W. 4
29	N. 2	S. W. 2	S. E. 2	W. 4	W. 4	S. W. 4	N. W. 4	N. W. 2	S. 4
30	S. 4	W. 2	N. 2	N. W. 4	N. W. 2	N. 2	S. W. 2	N. W. 4	N. W. 4
31	E. 2	N. W. 6	N. W. 8	.....	.....	.....	N. 2	N. W. 2	N. W. 2

Figures along side denote as follows: Breeze, (2); strong wind, (4); gale, (6); violent gale, (8); tornado, (10).

Maximum, Minimum and Mean Temperatures—Station, Barnegat New Jersey.

DAY OF MONTH.	1876.												1877.									
	JULY		AUG.		SEPT.		OCT.		NOV.		DEC.		JAN.		FEB.		MAR.		APRIL		MAY	JUNE
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	80	60	71	64	83	62	60	47	62	48	25	16	29	15	52	36	49	31	40	39	55	46	81	61
2	89	68	71	67	77	63	62	47	64	50	25	17	30	15	44	36	49	35	50	40	51	43	83	62
3	93	64	70	67	77	58	64	44	60	46	35	21	22	7	43	35	52	39	43	32	57	40	82	64
4	79	62	78	69	83	55	68	54	56	42	34	22	17	4	41	29	55	35	40	38	63	46	84	65
5	85	62	81	68	70	58	63	51	50	41	36	21	25	7	39	29	37	29	42	37	54	47	68	59
6	89	63	84	68	74	52	72	58	55	42	39	23	39	14	41	30	36	25	54	35	51	44	69	57
7	78	63	86	70	66	59	00	45	55	50	45	27	44	33	50	30	55	33	57	35	59	43	72	58
8	90	65	84	68	77	63	00	40	53	47	40	27	39	28	39	28	49	39	43	32	52	47	76	60
9	95	72	81	68	73	62	51	42	52	45	39	8	29	14	34	25	52	29	42	39	48	45	72	62
10	84	70	80	70	67	62	65	40	48	39	18	4	35	24	40	30	32	23	44	37	51	44	73	60
11	83	70	80	61	64	57	56	40	48	39	34	17	33	13	42	27	40	21	52	35	53	44	62	54
12	92	66	83	71	68	58	51	36	51	37	34	26	34	29	49	32	44	35	52	39	57	44	64	52
13	87	75	82	74	71	60	57	33	62	39	44	27	34	24	33	20	44	37	45	38	62	48	69	60
14	88	71	81	74	73	65	63	42	65	48	47	33	32	22	37	16	40	35	43	39	72	49	73	60
15	84	73	93	69	75	62	53	28	51	44	43	23	36	29	38	23	38	26	49	34	75	53	74	57
16	82	68	81	72	66	60	50	29	45	39	42	11	48	34	44	28	39	26	54	38	67	54	70	60
17	85	64	80	73	73	60	58	39	51	39	29	7	34	26	41	28	42	23	53	43	79	59	76	59
18	86	68	76	71	74	64	52	36	53	48	43	17	36	25	38	24	29	17	46	44	86	60	71	61
19	81	64	76	71	75	60	58	38	54	50	28	10	44	32	36	22	29	14	52	43	84	62	85	62
20	78	63	84	66	00	59	00	48	54	46	23	13	48	34	34	18	32	20	59	46	77	56	74	60
21	84	69	73	58	65	00	59	56	49	43	30	18	40	27	49	26	49	32	54	40	64	56	74	60
22	76	63	79	57	63	59	58	55	49	44	39	14	30	25	58	31	45	39	52	40	79	57	72	59
23	84	65	77	62	66	61	60	55	46	39	38	22	32	20	44	32	50	39	64	40	72	56	68	56
24	76	59	80	71	65	62	63	51	43	34	24	19	31	17	40	34	49	35	65	45	56	48	71	57
25	81	58	82	71	63	58	54	40	41	33	37	18	26	12	44	34	42	40	68	49	61	47	80	60
26	81	58	77	67	67	55	50	37	39	34	38	32	34	17	38	33	49	39	62	44	60	49	84	63
27	82	61	76	61	63	46	48	39	40	31	34	25	48	26	39	30	48	40	57	48	61	48	69	58
28	81	66	77	59	66	45	53	38	42	31	32	22	34	29	45	36	40	31	48	47	64	46	71	60
29	85	68	76	61	60	52	46	40	42	29	48	31	40	29	.....	.....	35	30	51	47	67	52	71	60
30	77	66	86	67	59	53	50	37	34	24	34	22	37	27	.....	.....	49	33	52	45	69	51	75	61
31	72	64	75	66	.....	.....	58	43	.....	.....	28	17	38	24	.....	.....	44	32	.....	.....	80	56	.....	.....
Range	37°		36°		38°		44°		41°		44°		44°		42°		41°		36°		46°	33°
Mo'ly means	74°.3		73°.3		64°.5		50°.6		45°.5		27°		28°.6		34°.8		37°.1		45°.6		56°.3	65°.5

Maximum, Minimum and Mean Temperatures—Station, Sandy Hook, New Jersey.

DAY OF MONTH.	1876.												1877.											
	JULY.		AUG.		SEPT.		OCT.		NOV.		DEC.		JAN.		FEB.		MAR.		APR.		MAY.		JUNE.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	89	69	77	64	87	67	60	49	65	49	23	16	25	16	51	37	46	33	48	36	60	48	85	64
2	94	75	73	66	76	66	61	49	70	55	27	18	24	20	46	37	51	36	49	38	53	43	87	63
3	87	77	73	65	74	60	65	52	64	50	35	26	23	11	40	36	51	41	48	33	58	40	87	66
4	94	74	78	67	79	60	63	55	56	46	35	28	20	8	41	34	48	33	43	38	61	47	79	66
5	89	74	84	67	70	58	56	51	51	46	35	25	24	11	42	31	39	23	44	36	56	46	73	66
6	86	72	90	70	74	57	72	55	54	44	39	26	36	18	40	33	42	20	51	39	57	46	71	62
7	88	69	93	73	69	61	67	48	56	49	42	33	45	36	41	31	47	33	53	39	64	55	68	60
8	100	72	88	74	74	63	58	42	52	46	42	31	42	27	39	32	55	36	50	34	56	44	78	62
9	97	70	84	70	72	62	53	41	54	45	38	8	28	14	37	25	55	30	46	38	54	46	82	63
10	86	68	86	70	67	57	66	49	47	41	19	6	28	18	39	28	31	23	52	39	52	45	79	65
11	96	72	85	69	62	55	58	42	47	41	26	17	36	18	45	33	45	23	61	40	60	44	67	59
12	92	71	85	70	68	59	58	39	51	41	36	24	37	20	54	28	48	37	52	38	63	49	69	58
13	95	74	83	72	70	59	61	42	59	42	49	31	28	20	29	19	41	35	45	37	71	48	73	61
14	87	75	80	73	75	63	66	45	59	42	47	35	29	21	35	18	40	33	48	38	77	52	82	64
15	92	73	89	71	73	61	46	33	46	41	42	28	33	25	44	18	37	25	59	39	76	54	80	64
16	88	70	85	73	65	51	49	35	46	30	37	8	41	30	51	36	36	27	57	39	82	59	76	69
17	89	69	79	69	72	55	54	42	48	41	22	7	31	24	41	26	36	19	56	43	84	63	79	67
18	93	73	77	69	73	65	56	30	51	45	34	14	36	26	35	25	27	17	46	43	82	64	80	64
19	95	72	77	69	71	61	59	43	48	45	26	14	40	32	37	21	27	14	49	42	86	65	83	68
20	96	72	84	67	68	61	56	47	48	44	23	14	44	36	35	21	33	20	51	45	88	63	72	61
21	86	73	74	61	65	59	59	55	48	42	23	19	38	24	43	31	56	30	51	42	64	55	79	60
22	77	68	79	61	61	56	61	55	48	42	36	17	30	24	52	34	58	39	62	42	74	54	73	60
23	84	68	77	68	63	57	61	56	47	40	34	20	33	23	41	34	56	38	67	44	67	55	73	57
24	78	62	81	69	63	59	61	53	43	37	24	17	33	16	40	33	58	39	74	48	55	45	82	57
25	77	61	85	69	65	58	59	45	44	34	28	17	25	16	41	34	42	37	63	50	60	48	84	67
26	82	63	81	68	65	57	51	42	43	35	33	28	38	21	39	64	46	37	62	46	68	52	88	66
27	82	64	77	65	60	49	46	41	41	34	33	25	43	31	42	33	48	30	61	49	66	53	72	61
28	85	67	78	63	64	48	47	40	41	34	30	21	36	28	46	34	40	28	50	46	73	52	71	59
29	84	68	80	76	72	55	47	37	41	33	42	25	37	31	....	....	35	30	59	46	77	54	71	59
30	70	64	79	67	62	51	54	39	36	23	36	23	39	30	....	....	48	33	64	46	79	57	78	60
31	73	62	80	67	....	....	57	49	....	....	28	18	43	31	....	....	47	35	....	....	87	60	....	....
Range	39°		32°		39°		39°		47°		43°		37°		36°		44°		41°		48°		31°	
M'ly means	770.7		740.2		630.9		510.3		450.9		270.3		280.7		320.2		370.4		470.2		590.2		690.2	

Table of Temperature and of Rainfall at Newark, N. J., from January 1, 1878, to December 31, 1878, by W. A. Whitehead.

MONTHS.	MINM. TEMP'E.		MAX. TEMP'E.		Mean Temp'e of Month.	Fair on Days.	Snow on Days.	Rain on Days.	Total Rain and Melted Snow—Inches.	Monthly Mean of Rain and Melt'd Snow in previous five years.
	Date.	Degree.	Date.	Degree.						
January	8	9.50	22	48.25	31.00	18	5	11	6.445	3.812
February	4	8.00	28	55.75	33.24	16	2	6	4.990	3.262
March	28	17.25	10	67.00	45.16	18	3	13	3.035	4.956
April	6	40.00	21	78.50	55.55	15	0	8	1.790	4.823
May	14	39.00	28	85.00	60.73	21	0	9	4.295	2.623
June	6	48.75	30	93.25	68.20	18	0	8	2.446	2.877
July	23	61.50	3	98.25	78.25	18	0	11	4.320	5.173
August	26	55.00	9	90.50	73.09	17	0	10	5.089	5.189
September	28	43.75	1-2	88.00	67.47	17	0	10	2.535	4.701
October	20	35.00	2	76.75	56.41	23	0	8	2.823	3.423
November	15	27.00	12	68.00	42.85	18	2	9	4.570	4.369
December	25	13.50	2	57.75	31.83	20	6	7	7.459	2.266
Means and Totals	Feb. 4	8.00	July 3	98.25	53.63	219	18	110	54.383	.....
Previous five years	Jan. 12, 1873.	-12.00	July 26, 1877.	99.00	50.48	227	30	97	48.499	.....

Thermometers in the shade, having a northern exposure, protected from reflection.

Statement showing how many times the wind was observed blowing from the eight cardinal points of the compass during each month and season of the year, ending June 30, 1877, compiled from the local observations taken at Station Barnegat, N. J., at 7 A. M., 2 P. M. and 9 P. M. (local time.)

WIND.	July, 1876.	August.	September.	October.	November.	December.	January, 1877.	February.	March.	April.	May.	June.	Spring.	Summer.	Autumn.	Winter.
N.	2	7	11	17	12	16	12	10	8	9	5	3	22	12	40	38
N. W.	10	11	11	18	26	34	35	31	31	18	18	9	67	39	55	90
W.	14	7	13	16	12	15	13	5	2	3	5	9	10	30	44	90
S. W.	26	11	5	16	5	10	19	11	10	3	12	14	35	51	26	90
S.	25	17	12	9	3	4	7	8	15	12	16	36	43	78	24	19
S. E.	4	15	9	3	4	1	2	4	9	15	12	8	36	27	18	7
E.	4	17	22	5	16	4	5	9	7	12	6	7	25	26	43	18
N. E.	8	7	7	9	12	8	9	6	11	17	8	3	36	18	28	23
Calm	0	1	0	0	0	1	1	0	0	1	1	1	2	2	0	2
Blank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Statement showing how many times the wind was observed blowing, &c., at Station Sandy Hook, N. J.

WIND.	July, 1876.	August.	September.	October	November.	December.	January, 1877.	February.	March.	April.	May.	June.	Spring.	Summer.	Autumn.	Winter.
N.	4	7	2	10	14	15	8	10	12	9	10	3	31	14	26	33
N. W.	8	9	18	18	17	23	18	31	17	14	23	8	64	25	53	72
W.	14	8	11	18	15	17	27	15	8	5	15	12	28	34	44	59
S. W.	18	7	6	16	2	13	13	9	5	6	11	11	22	36	24	35
S.	12	11	8	9	2	2	2	3	9	1	8	16	18	39	19	7
S. E.	19	23	15	7	8	0	3	3	12	25	13	25	50	67	30	6
E.	2	8	6	0	0	1	0	4	5	8	0	5	13	15	6	5
N. E.	15	12	21	10	28	16	14	7	13	18	11	6	42	33	59	37
Calm	1	8	3	5	4	6	8	2	2	4	2	4	8	13	12	16
Blank	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Meteorological Summary for 1878 of Observations by E. R. Cook—Station, Trenton

Thermometer highest, July 4th and 18th..... 97°
Thermometer lowest, January 7th..... 12°

Rained on ninety-eight days. *Snowed eighteen times. Five thunder showers. Fifteen fogs. †Twenty-seven frosts. Four hail storms.
First frost, September 16; first ice, October 29; first snow, November 6.

Amount of rain fallen in each month:

	INCHES.
January	7.55
February	2.80
March	3.90
April	1.50
May	4.70
June	5.60
July	4.45
August	4.45
September	3.40
October	1.85
November	4.25
December	5.85
	5.30

Snowfall during the year, 11 inches.
Snowfall since November 6, 4 inches.
*11 snows since November 6.
†17 frosts since September 16.

Report of the Medical Superintendent of Vital Statistics

TO THE SECRETARY OF STATE AND THE STATE BOARD OF HEALTH.

Under the new law concerning the registry and returns of marriages, births and deaths, it is made the duty of the person in charge of vital statistics to study the returns in reference to population and the causes and sources of disease, and the statistics and deductions therefrom are directed to be published as a part of the annual report of the State Board of Health. As the returns previous to June 1st have not yet been published and the year of new record will not be completed until the next annual report, we publish this year the returns as received under the *former* law. The same diligence as usual has been exercised in their collection. The number of marriages, births and deaths are only valuable as in contrast with more approved methods.

Under the new law returns are now received from every city and township of the State. In our next report we shall be able to submit a more correct estimate of the course of population, and of local and general causes of disease, than has before been attempted or been possible in this State. Yet it is to be remembered that a longer period than a single year is required for those more important comparisons which are so instructive for the guide of legislation as to great social questions.

The first intent of governments in such returns was to have a record which is of value in attesting rights of property and inheritance. These are so important as still to call for vigorous methods and careful preservation. References for this purpose are more frequent than generally supposed, and often weighty questions of equity turn thereupon. But vital statistics come to have a far wider sphere since the compilation of full statistics has been found a necessity by all nationalities.

A nation without its statistics is as embarrassed as is a great

mercantile or commercial interest without its data. These mus be so analyzed and arranged and reasoned upon as to regulat the State in its plans for development. So vital is this interes that at not infrequent intervals since 1853, the great power have combined in Statistical Congresses and their deliberation have commanded the attention of all governments. The Aus trian Minister of Commerce has well said, "statistics are no longe viewed as a mere theoretical science for the gratification of the curiosity of the learned since they subserve the practical ends of political society and lend service to administration as well in determining the value of existing institutions and laws as in weighing measures not yet carried out." (Toggenburg.)

In this department of statesmanship vital statistics has always commanded large attention and never more than in those later studies which have shown so important relations to the public health. Indeed the originator of the International Statistical Congress and the most distinguished of statisticians is M. Quetelet, of Brussels, whose labors have primary reference to the physical and intellectual laws of population and to the application of their principles to moral and political science. The department of life insurance is an illustration of how much such studies have to do with development of important interests. Dr. Farr, the English statist, speaks of it as one of the higher branches of mercantile interest and one of the most valuable discoveries of modern times. Yet it is directly dependent upon the accurate calculation of probabilities and of expectations of life which have had their origin and development through vital statistics. Some of the embarrassments which have limited its great capacities for the promotion of social and national welfare, have arisen from defects in statistical observations and classification, and from too great reliance on English tables, without adequate facts as to our own climate, temperament and social conditions.

Now no civilized country of Europe is without its system of registration, and our leading States as well as the general government are perfecting their methods and the whole matter is being investigated by experts preparatory to the census of 1880. Lord Bacon stated an axiom when he said "the true greatness of a State consisteth essentially in population and breed of men." "It is not too much to say that modern sanitary science owes its exist-

nce to the registration of death and the localization thereby of nsanitary conditions." The language of Elisha Harris, the most minent of American statists, well expresses their importance:

"The practical relations of well kept and complete records of nortality to the correct estimation of sanitary experience, and :o the most essential questions connected with the causation and prevention of diseases and premature death are so important, that sanitary authorities, and the wise and effectual application of public health measures, demand that the mortality registration shall be both complete and accurate. The fact is that the death-rate per thousand living people, fluctuates from eleven to forty, fifty, sixty, and even eighty per annum, in different places, the fluctuations being directly chargeable to the local, the domestic, personal, and to certain avoidable vital and unfortunate physiological conditions of the populations who present these variations in excess of a minimum rate of mortality. The population of London has suffered yearly death-rates equal to eighty, sixty, forty, thirty, and now, less than twenty-four to the thousand, these variations being due to the sanitary conditions under which the people lived, and the vital and constitutional vigor of the successive generations. * * * * *

"The proper understanding of the great governing causes of the premature mortality, on one hand, and of security to life and vigor, on the other, the unfolding and practical application of the laws of health, and of national prosperity and social welfare, and the true basis of wise sanitary administration in communities and States alike demand the complete and faithful registration of vital statistics. * * * * * * *

"Death, with its infinitely varied causes, is not completely described and most usefully studied until the great groups of the agencies that war against life and health are recognized and brought into the systematic account with the records of mortality, and until, indeed, the public records of marriage and birth in the successive generations, and the social, industrial, and general biological circumstances of the populations in communities and States are correspondingly registered and brought under review. The practical significance of death-rates, the economy of sanitary measures, the value of family or race culture, and of hereditary or constitutional health and the improvement of human welfare, will be correctly understood just in pro-

portion as the records of generations of people in all circumstances, and individuals in all these relations, are brought under correct methods of record and study of their life-history, from the cradle to the grave. The true significance of the records of causes of death will ever require the concurrent public registration of birth and marriage. The interests of the living, duty to those who die, and the ends of justice and order in communities alike require that the public records of mortality shall be complete and faithful in every place and among all classes of people. * * * * * * * * * *

"The permit for an interment must ever be the key to prompt compliance with the law for reporting, certifying, and proving or verifying the deaths, in all places." The results which have been obtained under this method and the inefficiency of all other methods fully justify insistance upon this prerequisite. It is only in exceptional cases and in very sparse communities that the requirement will be found inconvenient. This provision is so essential to that correctness which is indispensable that single cases only show that details should be so adjusted as to give the least possible trouble consistent with an assured return.

Our present law after the annoyance incident to any new requirement or change of method affecting so many has been well operated. The chief inconvenience has been where the proper officer has lived at a distance. This can easily be remedied, by powers of additional appointment entrusted to the Secretary of State, and by allowing the permit to be obtained by the undertaker where he resides. In cases where there has been no skilled attendance there can also be more simplicity as to the procurement of a permit; although not a few of such cases are found to result from improper treatment which the law tends to correct, rather than from suddenness of sickness or pecuniary disability.

In cases of interment out of the State by an arrangement with adjacent cities, we are now able to give permits which save the former inconvenience and expense, and the arrangement has been highly approved by all concerned. The marriage returns give far less trouble and are more complete and inexpensive than formerly, and have commended themselves to those concerned.

Our examination indicates that the birth returns will be fuller

than under the former law, but still will not be as complete as those of marriages and deaths. The total increase thus far for six months is over three thousand.

The chief difficulty arises from the inadvertency of physicians or from a feeling on the part of some of them that the State should not exact this service without compensation.

Such as have taken this view are no doubt sincere, but they are mistaken, and are without the support of those of their own profession who have given to the subject close examination and mature thought. The early opposition of some Scotch physicians is a matter of history. But it yielded not more to judicial opinion than it did to the calm advocacy of medical men. In 1874 the law was extended to England—the Registrar General with some severity discusses any dissent from the sustained view of the leading practitioners. It is not to be forgotten that in the advocacy of the voluntary returns of deaths, the Royal Colleges of Physicians, Surgeons and Apothecaries were foremost, and that Sir Henry Halford, Sir Astley Cooper and J. Hingeston, as their presiding officers over their own signatures, and by authority of these bodies, "entreat all authorized practitioners through the country to follow our example and adopt the same practice, and so assist in establishing a better registration in future throughout England." Ever since there has been increasing recognition on the part of practitioners of the importance to themselves as well as to the State of all these vital records. Discussions have been in later years merely as to methods The custom of all our larger cities has been the same. The consideration accorded to our uncertified signatures in such special and vital professional relations makes the rendering as a favor more decorous than claim as a reward, while our practical exemption from all jury duty may at least be reckoned as an offset. The counterfoil furnishes a convenient brief of cases and both the printed nomenclature and the habit of record tend to aid in method and precision. By those in Europe who have a right to speak from experience and for the profession, and by those in our own country who have given special thought thereto, it is recognized that not only does elevation accrue to the profession and service to the State, but that even in a pecuniary direction a reward accrues more than commensurate to the service. We therefore ask with confidence of all practitioners accurate re-

sponse to the requirements as to birth returns, as well as to those of death, as a duty due from our calling and citizenship without that urgency which pay may offer or penalty may enforce.

Our thanks are due to officers of county and city boards, and to the assessors of the townships for an efficiency and a courtesy which shows faithfulness and fulfillment of law beyond any motive which their small compensation can present. For this extra official work the compensation has never before been less than ten cents, and this is as small an amount therefore as economy can indicate. As returns are now made directly to the office of the Secretary of State at Trenton, there is by this a saving on each return over the former law, which will more than allow for the greatly needed increase. The objections that have been made to the practical operations of the law have been carefully considered, and it is fully recognized that the system can be made facile in its operation without impairment of those vital conditions upon which its value depends.

With the confident expectation that we shall be able to present in the future important facts, bearing on the course of population, the health of localities, and the general advancement of the interests of our citizens, this report is respectfully submitted.

MARRIAGES.

COUNTIES.	TOWNSHIPS.	Number.	Total in County.	REMARKS.
ntic.....	Atlantic City.....	.....		No return.
	Absecon.....	13		
	Buena Vista.....	.....		No return.
	Egg Harbor City.....	15		
	Egg Harbor Township.....	16		
	Galloway.....	10		
	Hamilton.....	5		
	Hammonton.....	11		
	Mullica.....	4		
	Weymouth.....	.....		No return.
			74	
;en.....	Englewood.....	17		
	Franklin.....	11		
	Harrington.....	9		
	Hohokus.....	4		
	Lodi.....	20		
	Midland.....	12		
	New Barbadoes.....	47		
	Palisade.....	3		
	Ridgefield.....	5		
	Ridgewood.....	1		
	Saddle River.....	5		
	Union.....	8		
	Washington.....	.....		No return.
			142	
ington.....	Bass River.....	.....		No return.
	Beverly.....	7		
	Bordentown.....	29		
	Burlington.....	32		
	Chester.....	.....		No return.
	Chesterfield.....	.....		No return.
	Cinnaminson.....	.....		No return.
	Evesham.....	12		
	Florence.....	.....		No return.
	Little Egg Harbor.....	18		
	Lumberton.....	20		
	Mansfield.....	.....		No return.
	Medford.....	11		
	Mount Laurel.....	.....		No return.
	New Hanover.....	7		
	Northampton.....	53		
	Pemberton.....	.....		No return.

COUNTIES.	TOWNSHIPS.	Number	Total in County	REMARKS.
Burlington	Randolph	.....		No return.
	Shamong	.....		No return.
	Southampton	11		
	Springfield	.....		No return.
	Washington	.....		No return.
	Westhampton	.....		No return.
	Willingboro	.....		No return.
	Woodland	.....		No return.
			200	
Camden	Camden	155		
	Centre	14		
	Delaware	7		
	Gloucester	12		
	Gloucester City	34		
	Haddon	19		
	Merchantville	4		
	Stockton	4		
	Waterford	6		
	Winslow	6		
			261	
Cape May	Cape May City	.....		No return.
	Dennis	10		
	Lower	5		
	Middle	8		
	Upper	15		
			38	
Cumberland	Bridgeton	77		
	Commercial	12		
	Deerfield	2		
	Downe	.....		No return.
	Fairfield	33		
	Greenwich	10		
	Hopewell	10		
	Landis	13		
	Maurice River	9		
	Millville	77		
	Stoe Creek	6		
			249	
Essex	Belleville	.....		No return.
	Bloomfield	24		
	Caldwell	6		
	Clinton	.....		No return.
	East Orange	39		
	Franklin	4		
	Livingston	5		
	Millburn	20		
	Montclair	21		
	Newark	941		
	Orange	67		
	South Orange	14		
	West Orange	7		
			1148	

COUNTIES.	TOWNSHIPS.	Number.	Total in County.	REMARKS.
ster.....	Clayton	16		
	Deptford	.....		No return.
	Franklin.....	17		
	Greenwich.....	27		
	Glassboro.....	16		
	Harrison.....	27		
	Logan	17		
	Mantua	11		
	Monroe	3		
	Swedesboro	.....		No return.
	Washington	16		
	West Deptford.....	3		
	Woodbury.....	40		
	Woolwich.....	12		
			205	
n.....	Bayonne.....	23		
	Guttenburg.....	.....		No return.
	Harrison.....	7		
	Hoboken	147		
	Jersey City.....	600		
	Kearney	3		
	North Bergen.....	42		
	Town of Union.....	22		
	Union	2		
	Weehawken	1		
	West Hoboken.....	24		
			871	
don	Alexandria	11		
	Bethlehem.....	15		
	Clinton.....	7		
	Delaware	17		
	East Amwell.....	14		
	Franklin.....	12		
	Frenchtown.....	14		
	High Bridge.....	8		
	Holland.....	.....		No return.
	Kingwood.....	21		
	Lambertville	37		
	Lebanon	11		
	Raritan	21		
	Readington	33		
	Tewksbury	10		
	Town of Clinton.....	.....		No return.
	Union.....	.....		No return.
	West Amwell.....	13		
			244	
.....	Chambersburg	16		
	East Windsor.....	.....		No return.
	Ewing.....	3		
	Hamilton.....	13		
	Hopewell.....	.....		No return.
	Lawrence.....	13		
	Princeton	24		

COUNTIES.	TOWNSHIPS.	Number.	Total in County.	REMARKS.
Mercer	Trenton	.....		No return.
	Washington	14		
	West Windsor	6		
			89	
Middlesex	Cranbury	13		
	East Brunswick	29		
	Madison	.....		No return.
	Monroe	.....		No return.
	New Brunswick	.....		No return.
	North Brunswick	17		
	Perth Amboy	.....		No return.
	Piscataway	19		
	Raritan	21		
	Sayreville	2		
	South Amboy	16		
	South Brunswick	36		
	Woodbridge	.....		No return.
			153	
Monmouth	Atlantic	1		
	Eatontown	11		
	Freehold	27		
	Holmdel	8		
	Howell	15		
	Manalapan	14		
	Marlboro	.....		No return.
	Matawan	14		
	Middletown	.....		No return.
	Millstone	.....		No return.
	Ocean	.....		No return.
	Raritan	43		
	Shrewsbury	.....		No return.
	Upper Freehold	48		
	Wall	.....		No return.
			181	
Morris	Boonton	19		
	Chatham	7		
	Chester	.....		No return.
	Hanover	.....		No return.
	Jefferson	11		
	Mendham	12		
	Montville	5		
	Morris	50		
	Mount Olive	12		
	Passaic	10		
	Pequannock	12		
	Randolph	.....		No return.
	Rockaway	20		
	Roxbury	.....		No return.
	Washington	.....		No return.
			158	
Ocean	Berkeley	3		
	Brick	.....		No return.
	Dover	6		

COUNTIES.	TOWNSHIPS.	Number.	Total in County.	REMARKS.
.....	Eagleswood.....	.....		No return.
	Jackson.....	.....		No return.
	Lacey	.....		No return.
	Manchester.....	5		
	Ocean	.....		No return.
	Plumsted.....	14		
	Stafford	2		
	Union.....	7		
			37	
c	Acquackanonk	5		
	Little Falls.....	.....		No return.
	Manchester.....	.....		No return.
	Passaic.....	.....		No return.
	Paterson	337		
	Pompton.....	28		
	Wayne.....	5		
	West Milford.....	25		
			400	
.....	Elsinboro.....	.....		No return.
	Lower Alloways Creek.....	8		
	Lower Penns Neck.....	8		
	Mannington.....	13		
	Pilesgrove	15		
	Pittsgrove.....	13		
	Quinton.....	.....		No return.
	Salem	54		
	Upper Alloways Creek.....	.....		No return.
	Upper Penns Neck.....	18		
	Upper Pittsgrove.....	13		
			142	
set	Bedminster.....	21		
	Bernards.....	20		
	Branchburg.....	.....		No return.
	Bridgewater	142		
	Franklin.....	9		
	Hillsborough	16		
	Montgomery.....	11		
	North Plainfield.....	11		
	Warren	10		
			240	
:	Andover.....	4		
	Byram.....	11		
	Frankford	4		
	Green.....	2		
	Hardyston	.....		No return.
	Hampton	1		
	Lafayette.....	.....		No return.
	Montague	5		
	Newton	.....		No return.
	Sandyston.....	16		
	Sparta.....	5		
	Stillwater.....	11		
	Vernon.....	.....		No return.

COUNTIES.	TOWNSHIPS.	Number.	Total in County.	REMARKS.
Sussex	Walpack	12		
	Wantage	15		
			86	
Union	Clark	.....		No return.
	Cranford	.....		No return.
	Elizabeth	192		
	Fanwood	.....		No return.
	Linden	10		
	New Providence	.....		No return.
	Plainfield	30		
	Rahway	41		
	Springfield	6		
	Summit	.....		No return.
	Union	15		
	Westfield	5		
			299	
Warren	Allamuchy	3		
	Belvidere	.....		No return.
	Blairstown	12		
	Franklin	9		
	Frelinghuysen	2		
	Greenwich	23		
	Hackettstown	.....		
	Hardwick	5		
	Harmony	8		
	Hope	0		
	Independence	.....		No return.
	Knowlton	7		
	Lopatcong	6		
	Mansfield	3		
	Oxford	.....		No return.
	Pahaquarry	.....		No return.
	Phillipsburg	.....		No return.
	Town of Washington	29		
	Washington	.....		No return.
			158	

RECAPITULATION.

MARRIAGES IN THE SEVERAL COUNTIES.

UNTIES.	Number.	REMARKS. TOWNSHIPS IN WHICH NO RETURNS HAVE BEEN MADE.
ic	74	Atlantic City, Buena Vista, Weymouth.
n	142	Washington.
igton	200	Bass River, Chester, Chesterfield, Cinnaminson, Florence, Mansfield, Mount Laurel, Pemberton, Randolph, Shamong, Springfield, Washington, Westhampton, Willingboro, Woodland.
en	261	
May	38	Cape May City.
erland	249	Downe.
.....	1,148	Belleville, Clinton.
ester	205	Deptford, Swedesboro.
on	871	Guttenburg.
rdon	244	Holland, Town of Clinton, Union.
r	89	East Windsor, Hopewell, Trenton.
esex	153	Madison, Monroe, New Brunswick, Perth Amboy, Woodbridge.
outh	181	Marlboro, Middletown, Millstone, Ocean, Shrewsbury, Wall.
s.....	158	Chester, Hanover, Randolph, Roxbury, Washington.
....	37	Brick, Eagleswood, Jackson, Lacey, Ocean.
ic.....	400	Little Falls, Manchester, Passaic.
.....	142	Elsinboro, Quinton, Upper Alloways Creek.
ret	240	Branchburg.
t	86	Hardyston, Newton, Vernon.
.....	299	Clark, Cranford, Fanwood, New Providence, Summit.
en	158	Belvidere, Independence, Oxford, Pahaquarry, Phillipsburg, Washington.
al in State...	5,375	

BIRTHS.

Births in Atlantic County.

TOWNSHIPS.	SEX.		OCCUPATION OF FATHER.								
	Male.	Female.	Farmer.	Manufacturer.	Mechanic.	Merchant.	Laborer.	Professional.	Not reported.	Sex not reported.	Total.
on	6	4	.....	.....	1	....	8	1	1	1	11
ntic City	.....	.....	.....	.....	.....	....	...	.	.....	.....	.....
a Vista	.....	.....	.....	.....	.....	....	...	.	.....	.....	.....
Harbor City	16	20	.....	1	19	4	10	2	.....	.....	36
Harbor Township	36	39	15	.....	6	4	49	1	.....	.....	75
way	28	19	15	.....	2	2	28	.	.....	.....	47
lton	22	18	8	.....	7	1	18	6	.....	.....	40
nonton	24	15	9	1	8	4	13	4	.....	.....	39
ca	7	3	4	.....	3	.....	...	1	2	.....	10
outh	9	8	2	.....	2	1	12	1	.....	1	18
turns.	148	126	53	2	48	16	38	6	3	2	276

Births in Bergen County.

TOWNSHIPS.	SEX.		OCCUPATION OF FATHER.								
	Male.	Female.	Farmer.	Manufacturer.	Mechanic.	Merchant.	Laborer.	Professional	Not reported	Sex not reported.	Total.
Englewood	35	38	2	.....	24	8	34	3	2	.....	73
Franklin	18	6	13	.....	6	.....	4	1	...	.....	24
Harrington	29	27	8	.....	12	7	29	.....	...	.....	56
Hohokus	3	1	4	.....	.	.....	1	.....	...	1	5
Lodi	60	63	3	2	4	18	50	3	...	1	124
Midland	20	26	16		1	4	14	1	...	.	46
New Barbadoes	55	45	1	.....	24	21	31	16	7	.	100
Palisade	16	7	3	.....	4	3	11	1	2	1	24
Ridgefield	9	12	7	1	9	6	11	3	11	27	48
Ridgewood	6	10	2	.....	3	2	9	.....	...	.	16
Saddle River	11	12	11	.....	2	1	9	.....	...	.	23
Union	35	39	6	1	8	7	38	5	...		75
*Washington	.....	...	...	.....	.	.....	.....	.....	...	...	.....
*No returns.	297	286	76	4	161	77	241	33	22	3	614

Births in Burlington County.

/NSHIPS.	SEX.		OCCUPATION OF FATHER.							Sex not reported.	Total.
	Male.	Female.	Farmer.	Manufacturer.	Mechanic.	Merchant.	Laborer.	Professional.	Not reported.		
er	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
ity	11	13	1	.....	10	4	9	.....	.....	.....	24
	13	12	3	.....	1	.....	17	4	.....	.....	25
n	44	26	5	.....	23	11	29	2	.....	.....	70
	68	67	10	3	45	18	49	6	4	.....	135
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
ld	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
son	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	10	20	10	.....	2	2	14	.....	4	2	32
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Harbor	43	23	5	1	11	4	43	2	.....	.....	66
	9	17	14	.....	4	.....	8	.....	.....	.....	26
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	13	15	12	.....	5	3	6	2	.....	.....	28
aurel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
ver	23	16	8	.....	5	5	19	2	.....	.....	39
ton	23	24	.....	1	13	2	19	3	10	1	48
n	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
on	16	8	5	.....	6	1	12	.....	.....	.....	24
ld	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
ton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
pton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
oro	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
d	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	273	241	73	5	125	50	225	21	18	3	517

Births in Camden County.

TOWNSHIPS.	SEX.		OCCUPATION OF FATHER.								
	Male.	Female.	Farmer.	Manufacturer	Mechanic.	Merchant.	Labore	Professional.	Not reported.	Sex not reported.	Total.
Camden	519	445	13	10	69	22	84	15	875	124	1088
Centre	16	27	14	.....	3	.....	24	1	1	.....	43
Delaware	12	10	11	.....	1	.....	10	.....	.....	.....	22
Gloucester	28	32	21	2	2	2	26	.....	16	9	69
Gloucester City	58	59	1	.....	48	11	51	6	.....	.....	117
Haddon	33	27	12	.....	11	13	20	4	.....	.....	60
Merchantville	5	3	1	.....	1	2	3	1	.....	.....	8
Stockton	29	20	4	.....	.....	.....	42	.....	3	.....	49
Waterford	3	1	1	.....	1	.....	2	.....	.....	.....	4
Winslow	9	18	4	.....	13	.....	10	.....	.....	.....	27
	712	642	82	12	149	50	272	27	895	133	1487

Births in Cape May County.

TOWNSHIPS.	SEX.		OCCUPATION OF FATHER.								
	Male.	Female.	Farmer.	Manufacturer	Mechanic.	Merchant.	Laborer.	Professional.	Not reported.	Sex not reported.	Total.
*Cape May City	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dennis	11	15	6	.....	3	2	14	1	.....	.....	26
Lower	16	20	9	.....	9	.....	15	2	1	.....	36
Middle	16	16	8	.....	3	1	18	2	.....	.....	32
Upper	20	26	13	1	4	1	27	.....	.....	.....	46
*No returns.	63	77	36	1	19	4	74	5	1	.....	140

Births in Cumberland County.

TOWNSHIPS.	SEX.		OCCUPATION OF FATHER.								
	Male.	Female.	Farmer.	Manufacturer.	Mechanic.	Merchant.	Laborer.	Professional.	Not reported.	Sex not reported.	Total.
idgeton	109	88	28	3	63	24	57	12	10	.....	197
ommercial	47	24	19	.....	9	5	39	.....	.....	1	72
erfield	18	17	23	.....	2	1	9	.....	.....	.....	35
Downe	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
airfield	35	54	16	.....	7	4	30	2	30	.....	89
reenwich	14	16	10	.....	1	.....	19	.....	.....	.....	30
lopewell	19	12	17	.....	3	1	14	.....	.....	4	35
andis	43	46	50	1	18	9	7	4	.....	.....	89
aurice River	37	40	20	.....	3	2	51	1	.....	.....	77
illville	94	76	9	.....	112	15	21	8	5	.....	170
toe Creek	13	9	11	.....	.....	.....	10	1	1	1	23
o return.	429	382	203	4	218	61	257	28	46	6	817

Births in Essex County.

TOWNSHIPS.	SEX.		OCCUPATION OF FATHER.								
	Male.	Female.	Farmer.	Manufacturer	Mechanic.	Merchant.	Laborer.	Professional	Not reported	Sex not reported.	Total.
elleville	.....	.....	.....			...	.....	.....	.....	.....	.....
Bloomfield	63	47	7	5	4	13	39	5	.....	.....	110
Caldwell	22	18	12		19	5	3	.....	.....	.....	40
Clinton	19	14	7		7	10	5	4	.....	.....	33
East Orange	59	59	.....	4	36	30	25	23		.....	118
Franklin	4	6	.....		5	.....	5	.....		.....	10
Livingston	3	2	4		...	.....	.....	1		.....	5
Millburn	25	26	.....		9	2	11	.....	28	.....	51
Montclair	58	67	7		28	19	57	13		.....	125
Newark	1913	1890	22	135	65	432	1193	58	498	.....	3803
Orange	133	147	.....	9	10	30	28	5	105	.....	280
South Orange	37	46	8		12	15	40	8		.....	83
West Orange	35	21	2		24	6	22	2		.....	56
o return.	2371	2343	69	48	756	562	1428	119	632	.....	4714

Births in Gloucester County.

TOWNSHIPS.	SEX.		OCCUPATION OF FATHER.								
	Male.	Female.	Farmer.	Manufacturer.	Mechanic.	Merchant.	Laborer.	Professional.	Not reported.	Sex not reported.	Total.
Clayton	33	29	11	2	23	2	21	3	.....	.....	62
Deptford	20	7	11		3	3	18	2	.....	.....	37
Franklin	40	31	27	1	19	2	20	2	.....	.....	71
Greenwich	34	29	28	2	4	4	21	4	.....	.....	63
Glassboro	24	34	4	.....	16	3	34	1	.....	.....	58
Harrison	30	24	38	2	6	4	.....	4	.....	.....	54
Logan	19	15	19	.....	1	.....	13	1	.....	.....	34
Mantua	21	20	21	.....	5	5	9	1	.....	.....	41
Monroe	16	[illegible]	2	.....	17	2	12	.....	.....	.....	33
*Swedesboro	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Washington	17	18	21	.....	1	1	9	1	2	.....	35
West Deptford	12	17	28	.....	2	2	2	1	.....	6	41
Woodbury	25	20	3	.....	14	8	18	5	4	7	59
Woolwich	24	22	21	.....	6	1	19	.....	.....	1	47
*No return.	315	293	234	7	117	37	196	25	6	14	623

Births in Hudson County.

TOWNSHIPS.	SEX.		OCCUPATION OF FATHER.								
	Male.	Female.	Farmer.	Manufacturer.	Mechanic.	Merchant.	Laborer.	Professional	Not reported.	Sex not reported.	Total.
Bayonne	99	82	.....	5	36	32	96	8	4	.....	181
*Guttenburg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Harrison	36	27	3	2	31	8	6	3	.....	.....	63
Hoboken	302	293	.....	7	232	166	84	13	3	.....	605
Jersey City	618	608	3	21	463	275	394	32	38	.....	1226
Kearney	9	7	.....	1	8	.....	6	1	.....	.....	16
North Bergen	14	11	2	.....	7	4	9	1	2	.....	25
Town of Union	61	61	3	3	60	23	29	4	.....	.....	123
Union	22	7	.....	.....	18	8	2	1	.....	.....	29
Weehawken	4	1	.....	.....	4	.....	1	.....	.....	.....	5
West Hoboken	33	31	1	.....	26	15	17	2	3	.....	64
*No return.	1208	1128	12	39	885	531	754	65	50	.....	2336

Births in Hunterdon County.

OWNSHIPS.	SEX.		OCCUPATION OF FATHER.								
	Male.	Female.	Farmer.	Manufacturer.	Mechanic.	Merchant.	Laborer.	Professional	Not reported.	Sex not reported.	Total.
ıdria	10	23	2	.....	4	5	10	2	.....	.....	33
ıem	19	13	9	.....	3	2	16	2	.....	.....	32
ı	28	11	18	.....	6		13	1	.....	.....	39
ıre	37	32	26	.....	11	4	22	6	.....	.....	69
mwell	22	11	8	.....	5	4	6		.....	.....	33
in	11	13	17	.....	4	1	2		.....	.....	24
ıtown	5	2	1	.....	4		1		.....	.....	7
Bridge	24	18		.....	6	4	20	1	.....	.....	42
nd	...	...		.....	.....		.....		.....	.....	.....
ood	20	16	20	.....	5	3	7	1	.....	.....	36
rtville	72	33		.....	47	8	45	5	2	2	107
ın	13	3	2	... ..	2		11		.....	.....	26
n	21	21	2	.....	5	4	11	1	.....		42
ıgton	22	22	22	.....	5	4	10	3	.....		44
bury	9	12	6	.....	3		1	1	.....		21
of Clinton	.....	.....		.....	.....		.....	.....	.....		.....
	5	5	6	.....	.....		3	.....	.....		10
Amwell	11	11	4	.....	2		15	.....	.....		22
urn.	329	256	213		112	44	193	23	2	2	587

Births in Mercer County.

TOWNSHIPS.	SEX.		OCCUPATION OF FATHER.								
	Male.	Female.	Farmer.	Manufacturer	Mechanic	Merchant.	Laborer.	Professional.	Not reported.	Sex not reported.	Total.
Chambersburg	48	44	.....	.....	49	6	35	2	.....	.....	92
*East Windsor	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ewing	16	10	7	.....	1	1	16	1	.....	.....	26
Hamilton	25	19	17	.....	3	1	23	.....	.....	.....	44
*Hopewell	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lawrence	29	29	11	.....	22	.....	23	2	.....	.....	58
Princeton	27	20	8	.....	5	6	24	1	3	.....	47
*Trenton	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Washington	7	4	5	.....	2	1	2	1	.....	.....	11
West Windsor	19	9	19	.....	2	.....	[illegible]	.....	.....	.....	28
*No return.	17	35	67	.....	84	15	130	7	3	.....	308

Births in Middlesex County.

TOWNSHIPS.	SEX.		OCCUPATION OF FATHER.								
	Male.	Female.	Farmer.	Manufacturer.	Mechanic.	Merchant.	Laborer.	Professional.	Not reported.	Sex not reported.	Total.
Cranbury	15	6	9	.....	[illegible]	1	9	[illegible]	1	.....	[illegible]
East Brunswick	37	45	28	.....	17	7	27	2	1	.....	[illegible]
*Madison	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
*Monroe	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
*New Brunswick	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
North Brunswick	14	16	10	.....	15	3	1	1	.....	.....	30
*Perth Amboy	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Piscataway	36	37	23	.....	8	13	23	4	2	.....	[illegible]
Raritan	52	37	26	2	17	[illegible]	37	4	1	.....	[illegible]
Sayreville	15	7	.....	.....	1	3	18	.....	.....	.....	[illegible]
South Amboy	53	55	.....	.....	17	8	80	3	.....	.....	168
South Brunswick	34	25	28	.....	3	4	23	1	.....	.....	59
*Woodbridge	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
*No return.	256	228	124	2	79	41	218	15	5	.....	[illegible]

Births in Monmouth County.

WNSHIPS.	SEX.		OCCUPATION OF FATHER.							Sex not reported.	Total.
	Male.	Female.	Farmer.	Manufacturer.	Mechanic.	Merchant.	Laborer.	Professional.	Not reported.		
.....	10	9	5	.....	3	3	8	.....	1	1	20
n	25	16	9	2	10	3	16	1	.....	.....	41
.....	4	3	1	.....	1	1	3	1	.....	.....	7
.....	7	7	4	.....	.....	.....	10	.....	.....	.....	14
.....	13	23	14	.....	9	.....	8	2	4	1	37
in.....	19	16	16	.....	2	7	10	1	.....	1	36
o.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	40	33	6	1	10	6	47	3	.....	.....	73
own	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
e.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
.....	46	51	8	.....	12	15	61	1	.....	.....	97
ury	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
eehold.....	21	30	11	.....	2	4	32	1	1	.....	51
.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	185	188	74	3	49	39	195	10	6	3	376

Births in Morris County.

TOWNSHIPS.	SEX.		OCCUPATION OF FATHER.								
	Male.	Female.	Farmer.	Manufacturer.	Mechanic.	Merchant.	Laborer.	Professional.	Not reported	Sex not reported.	Total.
Boonton	12	27	1		13	5	16	1	3	.....	39
Chatham	33	32	9	2	16	5	29	4	.....	.....	65
*Chester	.....	.....	.....		.....		.....	.....	.....	.....	.....
*Hanover	.....	.....	.....		.....		.....	.....	.....	.....	.....
Jefferson	16	10	11		3	1	11	.....	.....	.....	26
Mendham	13	14	11		3	2	2		9	.....	27
Montville	4	7	8		1		1		1	.....	11
Morris	165	132	9	2	50	41	165	0	30	0	307
Mount Olive	15	21	7		4		23	2		..	36
Passaic	17	14	15		5	2	8			..	31
Pequannock	22	23	19		10	5	10	1		..	45
*Randolph	.....	.....	.....		.....		.....			..	.....
Rockaway	91	81	16		21	3	126	5		..	172
*Roxbury	.....	.....	.....		.....		.....			..	.....
*Washington	.....	.....	.....		.....		.....			.....	.....
*No return.	388	361	106	6	126	64	391	23	43	10	759

Births in Ocean County.

TOWNSHIPS.	SEX.		OCCUPATION OF FATHER.								
	Male.	Female.	Farmer.	Manufacturer.	Mechanic.	Merchant.	Laborer.	Professional.	Not reported.	Sex not reported.	Total.
Berkeley	6	3	3	.....	1	1	4	.....	.....	.....	9
Brick	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dover	36	28	13	1	7	5	33	5	.....	.....	64
Eagleswood	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Jackson	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lacey	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Manchester	11	8	2	.....	4	.....	12	1	.....	.....	19
Ocean	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Plumsted	30	24	13	.....	10	.....	29	2	.....	.....	54
Stafford	9	10	7	.....	2	1	7	2	.....	.....	19
Union	15	12	1	.....	2	1	20	2	1	.....	27
No return.	107	85	39	1	26	8	105	12	1	.....	192

Births in Passaic County.

TOWNSHIPS.	SEX.		OCCUPATION OF FATHER.								
	Male.	Female.	Farmer.	Manufacturer.	Mechanic.	Merchant.	Laborer.	Professional.	Not reported.	Sex not reported.	Total.
Acquackanonk	14	10	3		3	1	7	.....	.....	.....	24
Little Falls	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Manchester	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Passaic	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Paterson	689	664	2	33	593	200	460	40	15	.....	1353
Pompton	23	22	9		4	1	30	.....	1	.....	45
Wayne	17	8	0		8	.....	7	.....	.....	.....	25
West Milford	41	40	37	.....	11	2	31	.....	.....	.....	81
No return.	784	744	81	33	619	204	535	40	16	.....	1528

Births in Salem County.

TOWNSHIPS.	SEX.		OCCUPATION OF FATHER.								
	Male.	Female.	Farmer.	Manufacturer.	Mechanic.	Merchant.	Laborer.	Professional.	Not reported.	Sex not reported.	Total.
*Elsinboro	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lower Alloways Creek	20	9	12	.....	2	1	14	.....	.....	.....	29
Lower Penns Neck	12	17	15	.....	1	1	11	1	.....	.....	29
Mannington	38	27	17	.....	4	1	35	.....	8	.....	65
Pilesgrove	14	20	9	.....	5	3	16	1	.....	.....	34
Pittsgrove	14	12	13	.....	1	1	10	1	.....	.....	26
Quinton	7	13	6	.....	6	.....	7	.....	1	.....	20
Salem	58	43	3	.....	40	8	47	3	.....	.....	101
Upper Alloways Creek	8	5	6	1	4	1	1	.....	.....	.....	13
Upper Penns Neck	52	40	36	.....	8	7	39	2	.....	.....	92
Upper Pittsgrove	31	21	30	.....	3	1	17	1	.....	.....	52
*No return.	254	207	147	1	74	24	197	9	9	.....	461

Births in Somerset County.

TOWNSHIPS.	SEX.		OCCUPATION OF FATHER.								
	Male.	Female.	Farmer	Manufacturer.	Mechanic.	Merchant.	Laborer.	Professional.	Not reported.	Sex not reported.	Total.
Bedminster	23	18	15	.....	7	5	18	.....	.....	5	46
Bernards	34	27	28	.....	12	4	15	2	.....	.....	61
*Branchburg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bridgewater	79	67	10	.....	42	18	69	7	.....	.....	146
Franklin	50	42	29	.....	22	7	26	4	5	1	93
Hillsborough	36	27	22	.....	8	4	27	2	.....	.....	63
Montgomery	20	27	16	.....	7	.....	14	3	.....	.....	40
North Plainfield	39	32	6	1	30	21	8	5	.....	.....	71
Warren	12	14	15	.....	6	1	3	.....	1	.....	26
*No return.	293	247	141	1	134	60	180	24	6	6	546

Births in Sussex County.

	SEX.		OCCUPATION OF FATHER.								
	Male.	Female.	Farmer.	Manufacturer	Mechanic.	Merchant.	Laborer.	Professional.	Not reported.	Sex not reported.	Total.
....	7	5	3	.....	1	3	5	.....	.....	.....	12
....	24	7	8	.....	1	2	18	2	.....	.....	31
....	13	4	6	.....	3	.....	6	.....	2	.....	17
....	10	3	7	.....	2	.....	4	.....	.....	.....	13
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
....	4	6	5	.....	.....	.....	5	.....	.....	.....	10
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
....	7	6	6	.....	1	1	5	.....	.....	.....	13
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
....	2	4	5	.....	.....	.....	1	.....	.....	.....	6
....	25	17	8	.....	4	3	27	.....	.....	.....	42
....	28	18	18	.....	6	3	19	.....	.....	.....	46
....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
....	11	5	13	.....	2	.....	.....	.....	1	.....	16
....	26	17	20	.....	2	4	16	1	.....	.....	43
	157	92	99	.....	22	16	106	3	3	.....	249

Births in Union County.

TOWNSHIPS.	SEX.		OCCUPATION OF FATHER.								
	Male.	Female.	Farmer.	Manufacturer	Mechanic.	Merchant.	Laborer.	Professional.	Not reported.	Sex not reported.	Total.
*Clark	.....	.....	...		.....	.....	.....	.....	.....	.....	.....
*Cranford	.....	.....	...		.....	.....	.....	.....	.....	.....	.....
Elizabeth	712	683	13	19	540	94	536	42	151	.....	1395
Fanwood	3	10	3		3	1	5	1	.....	.....	13
Linden	16	11	6		5	2	12	2	.....	.....	27
*New Providence	.....	.....	...		.....	.....	.....	.....	.....	.....	.....
Plainfield	62	82	3		27	7	20	0	77	.....	144
Rahway	78	88	1	5	65	19	60	7	9	.....	166
Springfield	11	20	2	2	7	3	5		12	.....	31
*Summit	.....	.....	...		.....	.....	.....	.....	.....	.....	.....
Union	31	33	13		10	11	27	3	.....	.....	64
Westfield	17	16	1		9	7	4	2	.....	.....	33
*No return.	930	943	42	26	666	144	679	67	249	.....	1873

Births in Warren County.

WNSHIPS.	SEX.		OCCUPATION OF FATHER.								
	Male.	Female.	Farmer.	Manufacturer.	Mechanic.	Merchant.	Laborer.	Professional.	Not reported.	Sex not reported.	Total.
ıy	10	8	6	.....	.....	1	9	.....	2	.....	18
re	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
'n	14	26	13	.....	12	4	10	1	.....	.....	40
	13	17	17	.....	1	2	9	1	.....	.....	30
ıysen	9	19	9	.....	2	2	14	.....	1	.....	28
:h	43	42	21	.....	18	6	36	2	2	.....	85
town	19	28	1	.....	13	8	23	2	.....	.....	47
ς	10	6	11	.....	1	.....	1	.....	3	.....	16
	13	11	10	.....	5	1	7	1	.....	.....	24
	19	18	10	.....	.....	2	23	2	.....	.....	37
dence	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
ı	19	14	14	.....	3	3	12	1	.....	.....	33
g	33	24	9	.....	9	1	38	.....	.....	.....	57
f	23	17	16	.....	2	5	14	.....	4	1	41
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
rry	8	3	5	.....	3	.....	3	.....	.....	.....	11
burg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Washington	21	*26	2	1	16	6	19	3	.....	.....	47
ton	19	10	4	.....	4	2	18	1	.....	.....	29
ı.	273	269	148	1	89	43	236	14	12	1	543

RECAPITULATION.

BIRTHS IN THE SEVERAL COUNTIES.

COUNTIES.	SEX.		OCCUPATION OF FATHER.								
	Male.	Female.	Farmer.	Manufacturer	Mechanic.	Merchant.	Laborer.	Professional	Not reported.	Sex not reported.	Total.
Atlantic	148	126	53	2	48	16	138	16	3	2	[illegible]
Bergen	297	286	76	4	161	77	241	33	22	31	[illegible]
Burlington	273	241	73	5	125	50	225	21	18	3	[illegible]
Camden	712	642	82	12	149	50	272	27	895	133	14
Cape May	63	77	36	1	19	4	74	5	1	.....	1
Cumberland	429	382	203	4	218	61	257	28	46	6	8
Essex	2371	2343	69	148	1756	562	428	119	632	.....	47
Gloucester	315	293	234	7	117	37	196	25	6	14	6
Hudson	1208	1128	12	39	885	531	754	65	50	.....	25
Hunterdon	329	256	213		[illegible]	44	193	23	2	2	5
Mercer	171	135	67		84	15	130	7	3	.....	3
Middlesex	256	228	24	2	79	41	218	15	5	.....	4
Monmouth	185	188	74	3	49	39	195	[illegible]0	6	3	3
Morris	388	361	06	6	126	64	391	23	43	10	7
Ocean	107	85	39		26	8	105	12	[illegible]	.....	1
Passaic	784	744	81	33	619	204	535	40	6	.....	152
Salem	254	207	47		74	24	197	9	9	.....	46
Somerset	293	247	41		134	60	180	24	6	6	54
Sussex	157	92	99		22	16	106	3	3	.....	24
Union	930	943	42	26	666	44	679	67	249	.....	187
Warren	273	269	48	1	89	43	236	14	2	1	54
	9943	9273	2119	296	5558	2090	6750	586	2028	211	194

Deaths in Atlantic Co...

TOWNSHIPS.	SEX.		CAUSE OF DEATH, AND NUMBER FROM EACH CAUSE.																													
	Male.	Female.	Apoplexy		Bilious Fever.		Casualty		Consumption.		Childbed.		Croup.		Cholera Infantum.		Convul-sions.		Diphtheria.		Dropsy		Dysentery.		Erysipelas.		Inflammation of Bowels.		Inflammation of Brain.		Inflammation of Lungs.		Measles.		Old Age.		Paralysis.		Scarlet Fever.		Small-pox.		Typhus Fever.		Whooping Cough.		All others.		Sex not reported.		Cause not reported.		Total.
Absecon	7	9							4										1		2														1		1								2		2		16
*Atlantic City	.....	...																																														.....
*Buena Vista	.....	...																																														.....
*Egg Harbor City	13	14	2												1		1		1																		10								2				27
*Egg Harbor Township	21	15			1				8										2		2						1		1		1						3								8		7		36
*Galloway	24	6					2		10				1				2								1				1								2				1		10				30
Hamilton	14								6		2						1		2																		8						5				1	25
Hammonton	16	21					1		8						4		1		1				1										4		2		8						8				40
Mullica	4	2							1																												4				1						6
Weymouth	1	2																																												3		3
*No return.	100	83	2		1		5		37		4		1		5		5		7		4				1		1		2		3		4		3		36		2		45		...		13		183

Deaths in Bergen County.

TOWNSHIPS.	SEX.		CAUSES OF DEATH, AND NUMBER FROM EACH CAUSE.																													
	Male.	Female.	Apoplexy.	Bilious Fever.	Casualty.	Consumption.	Child Bed.	Croup.	Cholera Infantum.	Convulsions.	Diptheria.	Dropsy.	Dysentery.	Erysipelas.	Inflammation of Bowels.	Inflammation of Brain.	Inflammation of Lungs.	Measles.	Old Age.	Paralysis.	Scarlet Fever.	Small Pox.	Typhus Fever.	Wooping Cough.	All others.	Sex not reported.	Cause not report.	Total.					
Englewood	21	21	...	...	1	2	1	1	3	3	1	1	11	...	1	...	...	...	...	1	6	...	1	...	8	...	1	42					
Franklin	8	6	...	...	...	4	...	...	...	2	...	1	...	...	...	...	...	...	2	2	...	...	...	...	2	...	1	14					
Harrington	22	22	2	...	4	7	...	1	...	1	2	1	1	...	4	...	1	...	1	...	...	...	...	...	19	...	...	44					
Hohokus	3	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	2	...	...	4					
Lodi	25	15	1	...	...	4	...	2	2	2	3	3	1	1	2	...	...	...	...	1	3	...	...	...	14	...	1	40					
Midland	21	22	1	...	2	7	1	...	1	2	5	2	...	...	1	...	3	...	2	1	3	...	...	...	11	...	1	43					
New Barbadoes	29	27	1	...	5	9	...	...	1	...	6	1	...	1	2	...	...	...	...	4	...	...	...	...	24	1	3	57					
Palisade	4	4	...	1	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	1	...	...	...	...	4	...	...	8					
Ridgefield	.....	.....	...	...	...	2	...	1	4	1	...	...	...	...	...	...	...	...	2	2	...	...	...	...	4	21	5	21					
Ridgewood	3	2	...	...	...	...	...	...	...	...	1	...	...	...	1	...	...	...	...	...	3	...	...	...	.....	...	...	5					
Saddle River	6	3	...	...	...	4	...	...	...	...	...	...	1	...	...	...	...	...	...	...	1	...	1	...	2	...	...	9					
Union	22	26	...	...	4	10	...	...	...	1	8	1	1	...	1	...	...	...	1	...	2	...	1	...	15	4	7	52					
*Washington	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.....	...	...	.....					

TOWNSHIPS.	Male.	Female.	Apoplexy.	Bilious Fever.	Casualty.	Consumption.	Child Bed.	Croup.	Cholera Infantum.	Convulsions.	Diphtheria.	Dropsy.	Dysentery.	Erysipelas.	Inflammation of Bowels.	Inflammation of Brain.	Inflammation of Lungs.	Measles.	Old Age.	Paralysis.	Scarlet Fever.	Small-pox.	Typhus Fever.	Whooping Cough.	All others.	Sex not report.	Cause not report.	Total.
*Bass River	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
*Beverly City	8	10	1	...	1	1	...	...	...	...	...	...	...	...	...	2	...	...	...	...	1	...	2	...	10	...	...	18
Beverly	88	87	...	...	6	34	3	9	10	6	6	4	...	...	3	3	...	...	11	5	15	...	5	...	43	...	12	175
Bordentown	71	66	1	...	4	36	...	7	10	3	15	...	...	...	1	...	...	...	2	7	12	...	2	...	34	...	3	137
Burlington	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
*Chester	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
*Chesterfield	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
*Cinnaminson	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Evesham	7	6	...	...	...	2	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	8	...	1	13
*Florence	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Little Egg Harbor	14	15	1	...	1	6	...	...	1	2	12	...	...	...	...	...	...	...	...	1	...	...	1	...	3	...	...	29
Lumberton	12	14	1	...	1	9	...	1	2	1	1	1	...	...	...	...	...	...	2	...	1	...	...	...	6	...	1	26
*Mansfield	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Medford	20	13	...	...	...	7	...	1	1	...	2	...	...	...	...	...	...	...	2	1	...	...	3	...	11	5	10	38
*Mount Laurel	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
New Hanover	12	11	...	2	...	5	...	...	7	...	...	...	...	...	...	...	...	...	2	3	...	...	...	...	3	...	1	23
Northampton	32	33	1	...	1	14	...	1	4	1	4	...	...	1	1	...	...	...	2	4	4	...	2	...	20	...	5	65
*Pemberton	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
*Randolph	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
*Shamong	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Southampton	5	4	...	...	...	1	...	1	...	1	3	...	...	...	...	...	...	...	...	...	...	...	...	2	1	...	2	9
*Springfield	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
*Washington	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
*Westhampton	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
*Willingboro	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
*Woodland	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
	269	259	4	2	14	115	3	20	35	14	43	7	...	1	5	5	...	...	21	21	33	...	15	...	139	5	36	533

*No return.

Deaths in Camden County.

TOWNSHIPS.	SEX.		CAUSES OF DEATH, AND NUMBER FROM EACH CAUSE.																								
	Male.	Female.	Apoplexy.	Bilious Fever.	Casualty	Consumption.	Child Bed.	Croup.	Cholera Infantum.	Convulsions.	Diptheria.	Dropsy.	Dysentery.	Erysipelas.	Inflammation of Bowels.	Inflammation of Brain.	Inflammation of Lungs.	Measles.	Old Age.	Paralysis.	Scarlet Fever.	Small Pox.	Typhus Fever.	Whooping Cough.	All others.	Sex not reported.	Cause not reported.	Total.
Camden	291	235	18	...	19	122	8	22	53	61	75	22	7	9	22	8	19	16	...	17	20	7	32	6	312	380	21	906
Centre	14	19	...	...	2	8	...	1	2	2	1	...	1	...	...	...	...	...	1	...	3	...	...	...	10	.....	2	33
Delaware	5	9	...	...	1	2	...	...	1	1	...	1	...	...	...	...	...	...	...	2	...	...	1	...	3	.....	1	14
Gloucester	29	20	...	...	...	9	...	...	1	1	2	5	1	...	...	...	...	...	...	...	3	...	...	...	26	3	3	52
Gloucester City	10	18	...	...	2	5	...	...	2	4	1	1	...	...	1	...	...	...	...	...	...	...	2	...	8	.....	1	28
Haddon	24	22	1	...	1	8	...	1	3	1	3	...	1	...	2	...	...	...	2	1	...	...	2	...	19	.....	1	46
Merchantville	2	3	...	...	...	...	...	...	...	1	2	...	...	...	...	...	...	...	...	...	...	...	...	...	2	.....	...	5
Stockton	4	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.....	2	9
Waterford	24	19	...	...	4	5	...	...	1	...	1	2	...	...	...	...	...	...	3	...	6	...	2	...	16	.....	3	43
Winslow	5	7	...	...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	1	2	...	...	...	4	.....	...	12

Deaths in Cape May County.

TOWNSHIPS.	SEX.		CAUSES OF DEATH, AND NUMBER FROM EACH CAUSE.																							
	Male.	Female.	Apoplexy.	Bilious Fever.	Casualty	Consumption.	Child Bed.	Croup.	Cholera Infantum.	Convulsions.	Diphtheria.	Dropsy.	Dysentery	Erysipelas.	Inflammation of Bowels.	Inflammation of Brain.	Inflammation of Lungs.	Measles.	Old Age.	Paralysis.	Scarlet Fever.	Small Pox.	Typhus Fever.	Whooping Cough.	All others.	Sex not reported.	Cause not reported.	Total.
*Cape May City	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.....
Dennis	16	11	3	...	...	6	...	...	...	...	...	3	...	...	...	...	...	...	3	...	...	...	2	...	5	2	7	29
Lower	20	24	1	...	...	6	...	2	...	...	15	2	...	...	...	...	...	...	2	...	...	...	1	...	14	...	1	44
Middle	12	7	...	...	1	5	2	...	...	...	5	2	...	...	1	...	...	...	...	1	...	...	...	...	2	...	...	19
Upper	8	8	...	1	2	2	...	...	1	...	...	3	...	...	...	...	...	...	1	...	...	...	1	...	3	...	2	16
	56	50	4	1	3	19	2	2	1	...	20	10	...	...	1	...	...	...	6	1	...	...	4	...	24	2	10	108

*No return.

Deaths in Cumberland County.

TOWNSHIPS.	SEX.		CAUSES OF DEATH, AND NUMBER FROM EACH CAUSE.																										
	Male.	Female.	Apoplexy.	Bilious Fever.	Casualty.	Consumption.	Child Bed.	Croup.	Cholera Infantum.	Convulsions.	Diphtheria.	Dropsy.	Dysentery.	Erysipelas.	Inflammation of Bowels.	Inflammation of Brain.	Inflammation of Lungs.	Measles.	Old Age.	Paralysis.	Scarlet Fever.	Small Pox.	Typhus Fever.	Whooping Cough.	All others.	Sexes not reported.	Cause not reported.	Total.
Bridgeton	65	70	...	...	2	37	2	...	16	4	1	4	...	...	...	...	...	8	8	7	...	...	3	2	41	...	.....	135
Commercial	14	8	1	1	...	6	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	2	2	3	3	8	25
Deerfield	3	5	...	...	...	.....	1	...	...	1	1	1	1	1	...	...	...	...	...	...	...	...	...	...	2	...	.....	8
*Downe	.....	.....	...	...	...	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.....	...	.....	.....
Fairfield	10	15	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...	6	...	.....	...	14	25
Greenwich	9	5	...	...	...	2	...	...	4	...	1	...	...	...	...	...	...	1	1	...	...	...	...	...	4	...	1	14
Hopewell	21	12	...	1	...	4	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	...	...	2	...	24	33
Landis	23	22	...	...	4	10	...	1	1	1	13	...	3	...	2	...	...	...	1	1	...	...	...	...	8	...	.....	45
Maurice River	9	16	...	1	1	4	1	...	2	1	...	1	...	...	1	...	...	...	1	1	...	...	...	...	11	...	.....	25
Millville	60	54	...	2	7	26	1	1	14	1	...	7	...	...	2	1	3	...	3	2	3	...	3	2	18	5	23	119
Stoe Creek	1	7	...	1	...	1	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	...	...	...	2	...	2	8
	215	214	1	6	15	91	5	2	37	8	16	13	6	1	5	1	3	10	18	12	4	...	14	6	91	8	72	437

*No returns.

TOWNSHIPS.	SEX.		CAUSES OF DEATH, AND NUMBER FROM EACH CAUSE.																														
	Male.	Female.	Apoplexy.	Bilious Fever.	Casualty.	Consumption.	Child Bed.	Croup.	Cholera Infantum.	Convulsions.	Diphtheria.	Dropsy.	Dysentery.	Erysipelas.	Inflammation of Bowels.	Inflammation of Brain.	Inflammation of Lungs.	Measles.	Old Age.	Paralysis.	Scarlet Fever.	Small Pox.	Typhus Fever.	Whooping Cough.	All others.	Sex not reported.	Cause not reported.	Total.
*Belleville	.....	.....	...	...	.....	.....	...	...	.....	.....	...	...	...	...	...	.....	.....	...	...	...	.....	...	.....	...	.....	...	...	.....
Bloomfield	34	22	1	...	1	11	...	2	2	.....	3	3	3	...	...	.....	.....	...	2	2	.....	...	.....	...	26	...	...	56
Caldwell	18	18	...	...	.....	6	1	1	.....	.....	4	...	...	...	...	.....	.....	1	1	3	1	...	.....	...	16	4	6	40
Clinton	14	12	...	...	.....	4	...	...	2	.....	2	...	...	...	...	.....	.....	...	2	1	8	...	.....	...	7	...	...	26
East Orange	28	27	1	...	1	15	...	5	1	.....	3	...	...	...	1	.....	1	...	3	1	1	...	.....	1	21	...	...	55
Franklin	11	7	...	...	.....	5	...	2	3	.....	2	...	...	...	...	.....	.....	...	1	...	1	...	.....	...	4	...	...	18
Livingston	3	6	...	...	.....	2	...	...	.....	.....	...	...	...	...	...	.....	.....	...	...	...	2	...	.....	...	5	...	...	9
Millburn	.....	1	1	...	2	6	...	...	.....	.....	...	1	...	1	...	.....	.....	...	...	1	.....	...	.....	...	4	29	14	30
Montclair	23	20	...	1	.....	10	2	5	.....	.....	...	...	...	...	...	.....	.....	...	1	...	1	...	.....	...	23	3	3	46
Newark	1660	1643	45	5	143	497	13	52	250	398	69	82	38	11	71	261	270	12	72	54	92	13	150	20	673	...	12	3303
Orange	15	18	...	1	1	11	...	1	4	2	6	3	.....	...	1	.....	.....	...	...	2	4	...	.....	4	18	50	25	83
South Orange	17	9	...	...	.....	5	...	...	2	.....	...	...	...	...	...	1	2	...	1	1	1	...	.....	...	13	...	...	26
West Orange	10	9	...	...	1	2	...	...	.....	.....	1	...	...	1	...	.....	.....	...	3	...	.....	...	.....	...	11	...	...	19
*No returns.	1833	1792	48	7	149	574	16	68	264	400	90	89	41	13	73	262	273	13	86	65	111	13	150	25	821	86	60	3711

Deaths in Gloucester County.

TOWNSHIPS.	SEX.		CAUSES OF DEATH, AND NUMBER FROM EACH CAUSE.																									
	Male.	Female.	Apoplexy.	Bilious Fever.	Casualty.	Consumption.	Child Bed.	Croup.	Cholera Infantum.	Convulsions.	Diphtheria.	Dropsy.	Dysentery.	Erysipelas.	Inflammation of Bowels.	Inflammation of Brain.	Inflammation of Lungs.	Measles.	Old Age.	Paralysis.	Scarlet Fever.	Small Pox.	Typhus Fever.	Whooping Cough.	All others.	Sex not reported.	Cause not reported.	Total.
Clayton	17	13	...	...	...	6	...	2	...	1	1	1	1	...	...	...	...	...	...	1	...	...	2	1	15	...	...	30
Deptford	13	6	...	...	1	5	...	...	3	...	...	4	...	1	...	...	...	...	...	...	1	...	...	...	4	...	...	19
Franklin	10	12	...	1	1	5	...	...	...	...	1	...	...	...	...	...	...	...	1	2	...	...	1	...	10	...	...	22
Greenwich	13	8	...	...	...	6	...	...	1	...	...	1	...	...	1	...	...	...	...	1	...	...	...	1	3	...	7	21
Glassboro	10	16	...	...	2	7	...	...	3	1	1	2	...	...	...	...	...	...	...	1	...	...	...	...	9	...	...	26
Harrison	9	10	1	...	1	6	...	...	...	...	...	1	1	...	...	...	...	...	2	...	...	...	2	...	3	...	...	19
Logan	6	5	...	...	...	3	...	...	...	...	...	1	...	...	...	...	...	...	...	1	...	...	...	2	3	...	1	11
Mantua	12	9	...	...	...	2	1	1	...	1	...	3	...	...	...	...	...	...	...	...	1	...	1	...	10	...	1	21
Monroe	1	5	...	...	...	2	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	2	...	1	6
*Swedesboro	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	.....
Washington	8	9	1	...	...	...	...	...	...	...	3	...	...	...	...	...	...	...	...	...	1	...	1	...	5	...	4	17
West Deptford	10	4	1	1	...	2	...	...	2	...	...	1	1	...	...	...	...	...	...	2	...	...	...	...	3	3	4	17
Woodbury	18	18	...	...	...	1	4	...	1	2	1	2	1	...	...	...	...	...	1	3	2	...	...	...	14	1	3	37
Woolwich	7	13	...	...	2	4	...	...	...	...	...	...	...	1	...	...	...	...	1	1	...	...	1	...	10	...	...	20
	124	129	2	2	10	52	1	6	9	4	8	17	4	1	2	...	...	...	5	11	5	...	8	4	93	4	21	266

Deaths in Hudson County.

| TOWNSHIPS. | SEX. | | CAUSES OF DEATH, AND NUMBER FROM EACH CAUSE. | | |

Deaths in Hunterdon County.

TOWNSHIPS.	SEX.		CAUSES OF DEATH, AND NUMBER FROM EACH CAUSE.																								
	Male.	Female.	Apoplexy.	Bilious Fever	Casualty.	Consumption.	Child Bed.	Croup.	Cholera Infantum.	Convulsions.	Diphtheria.	Dropsy	Dysentery.	Erysipelas.	Inflammation of Bowels.	Inflammation of Brain.	Inflammation of Lungs.	Measles.	Old Age.	Paralysis.	Scarlet Fever.	Small Pox.	Typhus Fever.	Whooping Cough.	All others.	Sex not reported.	Cause not reported.	Total.
Alexandria	12	10	...	5	3	5	...	...	...	...	...	...	1	...	...		...		3				.....	.....	5	.....	.....	22
Bethlehem	9	7	1	...	2	1	...	...	...	...	...	2	...	...		1	...		.....				1	.....	4	.....	4	16
Clinton	7	6	...	...	...	1	...	...	2	...	1	1	...	1	.....		...		.....				.....	.....	7	.....	.....	13
Delaware	20	12	...	...	1	6	...	1	...	1	1	2	...	...	1		...		4	.....			.....	.....	13	.....	2	32
East Amwell	11	10	...	...	1	4	...	...	2	...	...	1	...	...	.....		...			2			1	.....	10	.....	.....	21
Franklin	7	7	...	1	...	2	...	...	...	...	1	...	1		.....		...				.....	.....	.....	.....	4	.....	4	14
Frenchtown	4	2	...	...	...	...	...	...	...	...	...	1	...	...	.....		...				.....	.....	.....	.....	4	.....	.....	6
High Bridge	8	8	...	...	1	1	...	...	1	...	2	1	1	...	.....		.....	.....			1	.....	2	.....	6	.....	.....	16
*Holland	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kingwood	8	9	1	...	...	1	...	...	1	...	...	3	...	...	.....	.....	.....	.....	2	1	.....	.....	.....	.....	8	.....	.....	17
Lambertville	33	26	...	...	4	6	...	2	9	4	6	3	...	...	1	.....	...	.....	4	2	.....	.....	.....	1	15	.....	2	59
Lebanon	8	9	...	...	...	2	...	...	1	...	...	...	...	...	.....	.....	1	.....	2	.....	.....	.....	7	.....	4	.....	.....	17
Raritan	8	8	2	...	...	5	...	...	1	...	...	1	...	...	.....	.....	.....	.....	3	.....	.....	.....	.....	1	3	.....	.....	16
Readington	9	13	1	...	2	4	...	...	1	...	1	2	...	...	.....	.....	.....	.....	3	.....	.....	.....	.....	.....	8	.....	.....	22
Tewksbury	12	5	...	...	...	...	...	...	2	...	...	...	...	...	.....	.....	.....	.....	3	1	.....	.....	6	.....	4	.....	1	17
*Town of Clinton	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Union	3	1	...	...	...	2	...	...	...	...	...	...	...	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	4
West Amwell	3	6	...	...	1	1	...	...	1	2	3	...	...	...	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	9
	162	139	5	6	15	41	...	3	21	7	15	17	3	1	2	1	1	.....	25	7	1	.....	17	2	98	.....	13	301

*No return.

TOWNSHIPS.	SEX.		CAUSES OF DEATH, AND NUMBER FROM EACH CAUSE.																												
	Male.	Female.	Apoplexy.	Bilious Fever.	Casualty.	Consumption.	Child Bed.	Croup.	Cholera Infantum.	Convulsions.	Diphtheria.	Dropsy.	Dysentery.	Erysipelas.	Inflammation of Bowels.	Inflammation of Brain.	Inflammation of Lungs.	Measles.	Old Age.	Paralysis.	Scarlet Fever.	Small Pox.	Typhus Fever.	Whooping Cough.	All Others.	Sex not reported.	Cause not reported.	Total.
Chambersburg	25	22	.....	.....	2	6	3	6	1	2	7	...	.....	.....	...	1	.....	5	...	1	1	.....	2	.....	10	.....	.....	47
*East Windsor	.....	.....	.....	.....	...	...	...	...	...	...	...	...	.....	.....	...	...	.....	...	...	...	...	.....	.....	.....	...	.....	.....	.....
Ewing	6	11	.....	.....	1	1	...	...	...	1	2	2	.....	.....	...	...	.....	1	2	...	...	.....	.....	1	3	1	4	18
Hamilton	51	24	.....	.....	1	13	...	2	1	4	2	...	2	2	2	4	2	...	2	2	1	.....	4	.....	31	.....	.....	75
*Hopewell	.....	.....	.....	.....	...	...	...	...	...	...	...	...	.....	.....	...	...	.....	...	...	...	...	.....	.....	.....	...	.....	.....	.....
Lawrence	20	22	.....	.....	1	7	1	2	...	1	2	2	.....	.....	1	...	.....	2	2	...	1	.....	.....	2	16	.....	2	42
Princeton	12	14	1	.....	1	2	...	...	...	1	1	...	.....	.....	...	...	.....	...	1	1	...	.....	.....	.....	17	.....	1	26
*Trenton	.....	.....	.....	.....	...	...	...	...	...	...	...	...	.....	.....	...	...	.....	...	...	...	...	.....	.....	.....	...	.....	.....	.....
Washington	10	3	1	2	...	1	...	...	...	3	2	2	.....	.....	...	...	.....	...	1	...	..	.....	.....	.....	1	.....	.....	13
West Windsor	5	9	.....	.....	1	5	...	...	...	...	...	1	.....	.....	...	...	.....	...	1	1	...	.....	.....	.....	4	.....	1	14
* No returns.	129	105	2	2	7	35	4	10	2	12	16	7	2	2	3	5	2	8	9	5	3	.....	6	3	82	1	8	235

Deaths in Middlesex County.

TOWNSHIPS.	SEX.		CAUSES OF DEATH, AND NUMBER FROM EACH CAUSE.																									
	Male.	Female.	Apoplexy.	Bilious Fever	Casualty.	Consumption	Childbed.	Croup.	Cholera Infantum.	Convulsions.	Diphtheria.	Dropsy.	Dysentery	Erysipelas.	Inflammation of Bowels.	Inflammation of Brain.	Inflammation of Lungs.	Measles.	Old Age.	Paralysis.	Scarlet Fever.	Small Pox.	Typhus Fever.	Whooping Cough.	All others.	Sex not reported.	Cause not reported.	Total.
Cranbury	10	6	.....	.....	...	8	...	...	1	...	...	1	1	.....	...	...	...	.....	2	...	...	.....	.....	.....	4	1	.....	17
East Brunswick	24	32	2	.....	6	5	1	1	....	1	6	...	3	.....	1	...	...	.....	...	1	6	.....	.....	1	20	.....	2	56
*Madison	.....	.....	.....	.....	...	...	...	...	...	...	...	...	.....	.....	...	...	...	.....	...	...	...	.....	.....	.....	...	.....	.....	.....
*Monroe	.....	.....	.....	.....	...	...	...	...	...	...	...	...	.....	.....	...	...	...	.....	...	...	...	.....	.....	.....	...	.....	.....	.....
*New Brunswick	.....	.....	.....	.....	...	...	...	...	...	...	...	...	.....	.....	...	...	...	.....	...	...	...	.....	.....	.....	...	.....	.....	.....
North Brunswick	9	7	.....	.....	1	1	1	...	3	...	...	1	.....	.....	...	...	...	.....	1	1	3	.....	.....	.....	4	.....	.....	16
*Perth Amboy	.....	.....	.....	.....	...	...	...	...	...	...	...	...	.....	.....	...	...	...	.....	...	...	...	.....	.....	.....	...	.....	.....	.....
Piscataway	13	10	.....	.....	1	4	...	...	...	2	...	...	.....	.....	...	1	2	.....	...	...	...	.....	.....	.....	4	.....	9	23
Raritan	40	33	.....	.....	3	6	...	2	2	...	14	2	.....	.....	2	1	...	.....	...	5	3	.....	2	2	29	.....	.....	73
Sayreville	3	6	.....	.....	...	1	...	...	...	...	4	...	.....	.....	...	...	...	.....	...	...	3	.....	.....	.....	...	.....	.....	9
South Amboy	41	34	.....	1	7	9	1	4	4	9	4	2	.....	.....	...	...	1	1	2	...	19	.....	.....	.....	...	.....	.....	75
South Brunswick	21	11	.....	.....	4	1	1	...	...	...	1	2	.....	.....	...	...	1	2	...	1	...	.....	1	.....	...	.....	1	32
*Woodbridge	.....	.....	.....	.....	...	...	...	...	...	...	...	...	.....	.....	...	...	...	.....	...	...	...	.....	.....	.....	...	.....	.....	.....
	161	139	2	1	22	35	4	7	10	12	29	8	4	.....	3	2	4	3	5	8	34	.....	3	3	90	1	12	301

*No return.

TOWNSHIPS.	SEX.		CAUSES OF DEATH, AND NUMBER FROM EACH CAUSE.																														Sex not reported.	Cause not reported.	Total.
	Male.	Female.	Apoplexy.	Bilious Fever.	Casualty.	Consumption.	Child Bed.	Croup.	Cholera Infantum.	Convulsions.	Diphtheria.	Dropsy	Dysentery.	Erysipelas.	Inflammation of Bowels.	Inflammation of Brain.	Inflammation of Lungs.	Measles.	Old Age.	Paralysis.	Scarlet Fever.	Small Pox.	Typhus Fever.	Whooping Cough.	All others.									
Atlantic	4	2	...	...	1	...	...	2	...	...	...	...	...	...	...	2	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	3	6
Eatontown	15	7	1	...	...	2	...	...	...	...	1	2	...	...	...	2	...	...	4	2	...	...	...	1	2	...	...	...	...	...	...	...	...	22
Freehold	10	4	1	1	...	2	...	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	1	...	4	...	...	...	...	...	...	...	3	14
Holmdel	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1
Howell	6	11	...	...	...	2	...	...	...	...	1	1	...	...	...	...	...	...	...	...	4	...	...	...	1	...	...	...	...	...	...	...	9	17
Manalapan	10	11	...	...	1	3	...	...	...	...	2	1	...	...	1	1	...	...	3	1	...	...	...	...	6	...	...	...	...	...	...	...	2	21
*Marlboro	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Matawan	25	18	...	1	1	7	...	...	...	1	2	2	...	...	...	...	1	...	2	1	5	...	1	1	18	...	...	...	...	...	...	...	...	43
*Middletown	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
*Millstone	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
*Ocean	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Raritan	38	25	2	...	2	4	...	3	3	...	4	4	...	...	1	2	...	...	2	1	13	...	...	...	19	...	...	...	...	...	...	...	3	63
*Shrewsbury	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Upper Freehold	31	16	...	1	...	11	1	1	...	...	2	1	...	...	...	...	...	...	2	1	...	...	...	...	15	...	...	...	...	...	...	...	12	47
*Wall	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
*No return.	39	95	2	4	6	31	1	6	3	2	12	11	...	...	4	4	1	...	15	6	22	...	4	2	65	...	...	...	...	...	...	...	33	234

Deaths in Morris County.

TOWNSHIPS.	SEX.		CAUSES OF DEATH, AND NUMBER FROM EACH CAUSE.																												
	Male.	Female.	Apoplexy.	Bilious Fever.	Casualty.	Consumption.	Child Bed.	Croup.	Cholera Infantum.	Convulsions.	Diptheria.	Dropsy.	Dysentery.	Erysipelas.	Inflammation of Bowels.	Inflammation of Brain.	Inflammation of Lungs.	Measles.	Old Age.	Paralysis.	Scarlet Fever.	Small Pox.	Typhus Fever.	Wooping Cough.	All others.	Sex not reported.	Cause not reported.	Total.				
Boonton	12	12	...	.....	...	2	...	...	.....	1	1	2	1	...	1	...	...	.....	.....	.....	3	.....	...	...	12	...	1	24				
Chatham	15	9	1	.....	...	2	...	...	.....	.....	.....	1	.....	...	1	...	...	.....	.....	2	.....	.....	1	...	16	...	...	24				
*Chester	.....	.....	...	.....	...	...	...	...	.....	.....	.....	.....	.....	...	...	...	...	.....	.....	.....	.....	.....	...	...	.....	...	...	.....				
*Hanover	.....	.....	...	.....	...	...	...	...	.....	.....	.....	.....	.....	...	...	...	...	.....	.....	.....	.....	.....	...	...	.....	...	...	.....				
Jefferson	5	12	...	.....	...	3	...	...	.....	.....	4	1	.....	...	...	...	...	.....	1	.....	.....	.....	...	...	5	...	3	17				
Mendham	10	7	...	1	...	6	1	...	.....	.....	.....	.....	.....	...	...	...	...	.....	1	2	.....	.....	...	...	3	...	3	17				
Montville	7	4	...	.....	...	1	...	2	.....	.....	1	.....	.....	...	...	...	...	.....	.....	.....	3	.....	...	...	2	...	2	11				
Morris	100	85	3	.....	2	29	1	3	9	5	12	7	5	3	2	2	3	1	9	3	5	.....	3	...	58	6	26	191				
Mount Olive	9	7	...	.....	3	2	...	1	.....	.....	1	.....	1	...	1	...	...	.....	.....	.....	2	.....	...	...	5	...	...	16				
Passaic	14	4	...	.....	1	4	...	...	1	2	.....	.....	.....	...	...	...	1	.....	.....	3	.....	.....	1	...	4	...	1	18				
Pequannock	3	6	...	.....	1	1	...	...	.....	1	.....	.....	.....	...	...	...	...	.....	.....	.....	.....	.....	...	1	3	...	2	9				
*Randolph	.....	.....	...	.....	...	...	...	...	.....	.....	.....	.....	.....	...	...	...	...	.....	.....	.....	.....	.....	...	...	.....	...	...	.....				
Rockaway	27	22	...	.....	2	2	1	2	1	5	3	1	4	2	...	...	3	.....	.....	3	5	.....	4	3	2	...	6	49				
*Roxbury	.....	.....	...	.....	...	...	...	...	.....	.....	.....	.....	.....	...	...	...	...	.....	.....	.....	.....	.....	...	...	.....	...	...	.....				
*Washington	.....	.....	...	.....	...	...	...	...	.....	.....	.....	.....	.....	...	...	...	...	.....	.....	.....	.....	.....	...	...	.....	...	...	.....				
	202	168	4	1	9	52	3	8	11	14	22	12	11	5	5	2	7	1	11	13	18	.....	9	4	110	6	44	376				

*No return.

| TOWNSHIPS. | SEX. | | CAUSES OF DEATH, AND NUMBER FROM EACH CAUSE. | | |

Deaths in Passaic County.

TOWNSHIPS.	SEX.		CAUSES OF DEATH, AND NUMBER FROM EACH CAUSE.																									
	Male.	Female.	Apoplexy.	Bilious Fever.	Casualty	Consumption	Child Bed.	Croup.	Cholera Infantum.	Convulsions.	Diphtheria.	Dropsy	Dysentery.	Erysipelas.	Inflammation of Bowels.	Inflammation of Brain.	Inflammation of Lungs.	Measles.	Old Age.	Paralysis.	Scarlet Fever.	Small Pox.	Typhus Fever	Whooping Cough.	All others.	Sex not reported.	Cause not reported.	Total.
Acquackanonk	6	7	...	...	2	1	...	...	1	.....	1	1	...	...	...	.....	.....	.....	1	...	...	.....	.....	.....	6	.....	.....	13
*Little Falls	.....	.....	...	...	...	.....	...	...	...	.....	.....	.....	...	...	...	.....	.....	.....	...	...	...	.....	.....	.....	.....	.....	.....	.....
*Manchester	.....	.....	...	...	...	.....	...	...	...	.....	.....	.....	...	...	...	.....	.....	.....	...	...	...	.....	.....	.....	.....	.....	.....	.....
*Passaic	.....	.....	...	...	...	.....	...	...	...	.....	.....	.....	...	...	...	.....	.....	.....	...	...	...	.....	.....	.....	.....	.....	.....	.....
Paterson	495	489	9	4	38	128	18	33	40	43	183	21	13	5	15	37	41	6	34	14	64	8	12	7	204	.....	7	984
Pompton	12	7	2	..	1	2	1	...	1	.....	.....	.....	...	2	...	.....	.....	.....	...	...	...	.....	.....	.....	6	.....	4	19
Wayne	6	8	...	.....	1	1	...	...	...	.....	1	2	...	...	...	.....	.....	.....	1	1	2	.....	.....	.....	4	.....	1	14
West Milford	7	9	1	.....	...	1	...	...	...	.....	.....	2	3	...	...	.....	.....	.....	1	1	...	.....	.....	.....	7	.....	.....	16
*No return.	526	520	12	4	42	133	19	33	42	43	185	26	16	7	15	37	41	6	37	16	66	8	12	7	227	.....	12	1046

| TOWNSHIPS. | SEX. | | CAUSES OF DEATH, AND NUMBER FROM EACH CAUSE | | |

Deaths in Somerset County.

TOWNSHIPS.	SEX.		CAUSES OF DEATH, AND NUMBER FROM EACH CAUSE.																												
	Male.	Female.	Apoplexy	Bilious Fever.	Casualty.	Consumption.	Child Bed.	Croup.	Cholera Infantum.	Convulsions.	Diphtheria.	Dropsy.	Dysentery.	Erysipelas.	Inflammation of Bowels.	Inflammation of Brain.	Inflammation of Lungs.	Measles.	Old Age.	Paralysis.	Scarlet Fever.	Small Pox.	Typhus Fever.	Whooping Cough.	All others.	Sex not reported.	Cause not reported.	Total.
Bedminster	16	5		1	1	8	1	1	4		1	3			1				2	1					7	4	4	35
Bernards	18	5				6	1		1			3	2		1		1		2	4	1				11			33
*Branchburg																															
Bridgewater	52	5	1		10	18			3		3			1			1		8	2			1	1	20		34	103
Franklin	23	16		1	6	7		1	2			1			2		3		2	1	1		2		10			39
Hillsborough	23	21			4	5			3	1	3	2			1		1		7	3			1	1	12			44
Montgomery	12	13			1	1			2		1	2	1			1		1	1					1	13			25
North Plainfield	16	9			2	7			2	1		1											1		8		3	25
Warren	7	5	1	1		3			2	1		1								1					2			12
	167	145	2	3	24	55	2	2	19	3	8	13	3	1	5	1	6	1	22	12	2		5	3	83	4	41	316

| TOWNSHIPS. | XIII. | | CAUSES OF DEATH, AND NUMBER FROM EACH CAUSE. | | |

Deaths in Union County.

TOWNSHIPS.	SEX.		CAUSES OF DEATH, AND NUMBER FROM EACH CAUSE.																										
	Male.	Female.	Apoplexy.	Bilious Fever.	Casualty.	Consumption.	Child Bed.	Croup.	Cholera Infantum.	Convulsions.	Diphtheria.	Dropsy.	Dysentery.	Erysipelas.	Inflammation of Bowels.	Inflammation of Brain.	Inflammation of Lungs.	Measles.	Old Age.	Paralysis.	Scarlet Fever.	Small Pox.	Typhus Fever.	Whooping Cough.	All others.	Sex not reported.	Cause not reported.	Total.
*Clark	.....	.....	...	...	.....	.....	...	...	.....	.....	...	...	...	...	...	.....	.....	...	...	...	...	...	.....	...	.....	...	...	.....
*Cranford	.....	.....	...	...	.....	.....	...	...	.....	.....	...	...	...	...	...	.....	.....	...	...	...	...	...	.....	...	.....	...	...	.....
Elizabeth	424	446	12	...	34	99	8	30	61	69	54	26	17	12	9	10	26	15	12	19	35	7	9	18	256	...	32	870
Fanwood	1	2	...	...	.....	1	...	...	.....	.....	...	...	...	...	...	.....	.....	...	.....	...	.....	...	.....	...	.....	...	2	3
Linden	3	3	...	1	.....	1	...	...	.....	1	...	...	...	...	1	.....	.....	...	1	...	.....	...	.....	...	1	...	...	6
*New Providence	.....	.....	...	...	.....	.....	...	...	.....	.....	...	...	...	...	...	.....	.....	...	...	...	.....	...	.....	...	.....	...	...	.....
Plainfield	34	34	3	...	1	27	...	...	.....	.....	2	1	...	1	...	.....	.....	...	1	3	2	...	.....	...	19	...	8	68
Rahway	62	65	2	4	3	12	1	2	7	4	6	4	...	...	5	1	3	...	3	3	4	...	6	2	30	...	25	127
Springfield	6	3	...	...	1	2	...	...	.....	.....	...	2	...	...	...	.....	.....	...	2	...	.....	...	.....	...	2	...	...	9
*Summit	.....	.....	...	...	.....	.....	...	...	.....	.....	...	...	...	...	...	.....	.....	...	...	...	.....	...	.....	...	.....	...	...	.....
Union	11	12	...	...	1	.....	3	...	1	1	...	2	...	1	...	.....	.....	...	3	1	3	...	1	...	5	...	1	23
Westfield	13	16	...	...	.....	5	...	...	.....	.....	12	...	...	...	1	.....	.....	...	2	1	1	...	.....	2	5	...	...	29
	554	581	17	5	40	147	12	32	69	75	74	35	17	14	16	11	29	15	24	27	45	7	16	22	318	...	68	1135

*No returns.

TOWNSHIPS.	SEX.		CAUSES OF DEATH, AND NUMBER FROM EACH CAUSE.																									
	Male.	Female.	Apoplexy	Bilious Fever.	Casualty.	Consumption.	Child Bed.	Croup	Ch'l'a Infantum.	Convulsions.	Diphtheria.	Dropsy.	Dysentery.	Erysipelas.	Inflammation of Bowels.	nflammation of Brain.	nflammation of Lungs.	Measles.	Old Age.	Paralysis.	Scarlet Fever.	Smal Pox.	Typhus Fever.	Whoop'g Cough.	All others.	Sex not reported.	Cause not reported.	Total.
Allamuchy	6	4																							3		7	10
*Belvidere																												
Blairstown	9	6	1			1					4		1							1					7			15
Franklin	3	6																						1	1		7	9
Frelinghuyssen	2	8			1	2													3						4			10
Greenwich	9	8		2	3	3				2		3							1					2	10		1	27
Hackettstown	0					7	1	5				1													7			21
Hardwick	4																								4			4
Harmony	8	4				1		2	1	1		1							1						5			12
Hope	5	8		1		3		1			1	2					2								2		1	13
*Independence																												
Knowlton		0				1		1			1						1		1	1	2		2		6		1	17
Lapatcong	5	9				2	2		1	4	3				1				1				3		7			24
Mansfield	19	15	1	1		6		1	1	1		3	1				1		2	1			4		9		2	34
*Oxford																												
Pahaquarry	2	1					1																		1		1	3
*Phillipsburg																												
Town of Washington	1	10		1		3			1						1				1						2		2	11
Washington	6	7			1				3			1							4	4								13
	106	117	2	5	5	29	4	10	7	8	9	11	2		2		4		4	7	2		9	3	68		22	223

*No return.

RECAPITULATION—Deaths in the Several Counties.

COUNTIES.	SEX.		CAUSES OF DEATH, AND NUMBER FROM EACH CAUSE.																												Total.
	Male.	Female.	Apoplexy	Bilious Fever	Casualty.	Consumption.	Child Bed.	Croup.	Cholera Infantum.	Convulsions.	Diphtheria.	Dropsy.	Dysentery.	Erysipelas.	Inflam'n of Bowels.	Inflam'n of Brain.	Inflam'n of Lungs.	Measles.	Old Age.	Paralysis.	Scar et Fever.	Small-pox	Typhus Fever	Whooping Cough.	All others.	Sex not reported.	Cause not reported.	
Atlantic	100	83	2	1	5	37	4		5	5	7	4	1		1	1	2	3	4	3	36	...	2	1	45	.....	13	183
Bergen	164	149	5	1	16	49	2	5		12	26	10	17	2	12	.....	4	.....	10	12	18	...	3	...	105	26	19	339
Burlington	269	259	4	2	14	5	3	20	35	14	43	7	.....	1	5	5	.....	.....	21	21	33	...	15	...	139	5	36	533
Camden	408	357	9	...	29	62	8	24	63	71	85	31	10	10	25	8	19	16	7	21	34	7	39	16	400	383	44	1148
Cape May	56	50	4	1	3	9	2	2	1	.....	20	10	.....	...	1	.....	.....	.....	6	1	...	...	4	...	24	2	10	108
Cumberland	215	214	1	6	15	91	5	2	37	8	16	13	6	1	5	1	3	10	18	12	4	...	14	6	91	8	72	437
Essex	1833	1792	48	7	149	574	16	68	264	400	90	89	41	13	73	262	273	13	86	65	111	13	150	25	821	86	60	3711
Gloucester	134	128	3	2	10	52	1	6	9	4	8	17	4	1	2	.....	.....	.....	5	11	5	...	8	4	93	4	21	266
Hudson	.....	.....	42	12	64	274	47	77	238	165	255	70	21	24	87	47	101	53	33	66	138	10	55	69	603	2591	.....	2591
Hunterdon	162	139	5	6	15	41	.....	3	21	7	15	17	3	1	2	1	1	.....	25	7	1	...	7	2	98	.....	13	301
Mercer	129	105	2	2	7	35	4	10	2	12	16	7	2	2	3	5	2	8	9	5	3	...	6	3	82	1	8	235
Middlesex	161	139	2	1	22	35	4	7	10	12	29	8	4	...	3	2	4	3	5	8	34	...	3	3	90	1	12	301
Monmouth	139	95	2	4	6	31	1	6	3	2	12	11	.....	...	4	4		.....	15	6	22	...	4	2	65	.....	33	234
Morris	202	168	4	1	9	52	3	8	11	14	22	12	11	5	5	2	7	1	11	13	18	...	9	4	110	6	44	376
Ocean	78	75	2	2	3	32	.....	.....	9	4	5	3	2	...	1	1	.....	.....	3	6	33	...	9	.....	34	.....	4	153
Passaic	526	520	12	4	42	133	19	33	42	43	185	26	16	7	15	37	41	6	37	16	66	8	12	7	227	.....	12	1046
Salem	113	145	1	1	10	59	3	2	15	7	3	11	1	...	1	.....	.....	2	13	7	2	...	26	1	77	2	18	260
Somerset	167	145	2	3	24	55	2	2	19	3	8	13	3	1	5	1	6	1	22	12	2	...	5	3	83	4	41	316
Sussex	99	87	1	2	8	26	1	2	2	1	19	5	1	...	1	.....	5	.....	11	.....	8	...	5	.....	53	3	38	189
Union	554	581	17	5	40	147	12	32	69	75	74	35	17	14	16	11	29	15	24	27	45	7	16	22	318	.....	68	1135
Warren	106	117	2	5	5	29	4	10	7	8	9	11	2	...	2	.....	4	.....	14	7	2	...	9	3	68	.....	22	223

DEATHS.

Deaths in Atlantic County.

WNSHIPS.	AGES.												
	Under 5 years.	5 and under 10.	10 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and under 100.	Over 100.	Ages not reported	Total.
.....	7		1	1	1	1	2	1	1	.....		.....	1	16
City.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vista.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
bor City.....	10	4	1	3	1	3	.....	3	.....	.....	.....	.....	2	27
bor Township..	11	1	1	4	6	2	.....	.....	1	.....	.....	.....	8	36
.....	7	.....	3	3	2	3	.....	4	3	3	.....	.....	1	30
.....	12	1	1	.....	2	2	.....	2	1	.....	.....	.....	3	25
iton	16	6	2	.....	1	...	5	2	4	2	1	.....	1	40
.....	1	1	3	.....	1	...	.....	.....	...	.....	.....	.....	...	6
th	.....	.....	.....	.....	...	...	.....	.....	1	1	.....	.....	1	3
	64	13	12	14	11	0	3	11	6	1	.....	17	183	

Deaths in Bergen County.

TOWNSHIPS.	AGES.												
	Under 5 years.	5 and under 10.	10 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and under 100.	Over 100.	Ages not reported.	Total.
Englewood	25	5	1	2	2	3	4	...	...	...	...	.....	...	42
Franklin	2	.....	...	1	2	.....	2	3	2	2	...	.....	...	14
Harrington	20	1	3	2	.....	4	4	2	6	2	...	.....	...	44
Hohokus	...	.....	...	.....	1	1	...	...	...	...	2	.....	...	4
Lodi	3	.....	...	10	5	1	1	3	2	...	...	.....	5	40
Midland	10	5	1	3	4	1	5	6	2	4	1	.....	1	43
New Barbadoes	8	2	6	5	3	4	5	2	6	4	2	.....	10	67
Palisade	2	2	1	.....	1		1	1	...	...	...	.....	...	8
Ridgefield	3	2	.....	2	.....		3	3	2	1	...	.....	4	21
Ridgewood		2	1	.....	.....		...	...	...	...	...	.....	...	5
Saddle River	2	.....	.....	.....	1	2	...	2	2	...	...	.....	...	9
Union	19	4	5	2	6	3	3	4	1	2	...	.....	3	52
*Washington	.....	.....	.....	.....	.....	...	...	...	...	...	...	.....	...	.....
	105	23	18	27	25	21	28	26	23	15	5	53		339

*No return.

Deaths in Burlington County.

NSHIPS.	AGES.												
	Under 5 years.	5 and under 10.	10 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and under 100.	Over 100.	Ages not reported.	Total.
er	.....	.....	.....	.....	.....	...	...	...	...	...	...	.....	.....	.....
ity	.....	.....	.....	.....	.....	...	...	...	...	...	...	.....	.....	.....
	6	2	1	1	3	...	...	1	3	...	1	.....	.....	18
n	68	13	7	17	10	13	11	9	10	6	4	.....	7	175
-	50	10	6	11	13	14	9	12	9	3	...	.....	.....	137
	.....	.....	.....	.....	.....	...	...	...	...	...	...	.....	.....	.....
ld	.....	.....	.....	.....	.....	...	...	...	...	...	...	.....	.....	.....
ison	.....	.....	.....	.....	.....	...	...	...	...	...	...	.....	.....	.....
	6	.....	.....	.....	.....	1	3	1	2	...	...	.....	.....	13
	.....	.....	.....	.....	.....	...	...	...	...	...	...	.....	.....	.....
Harbor	9	5	5	2	3	1	2	1	...	...	...	.....	1	29
	9	1	1	1	6	5	...	1	2	...	...	.....	.....	26
	.....	.....	.....	.....	.....	...	...	...	...	...	...	.....	.....	.....
	7	3	4	4	2	1	2	3	6	2	...	.....	4	38
aurel	.....	.....	.....	.....	.....	...	...	...	...	...	...	.....	.....	.....
over	7	1	1	.....	1	3	2	2	3	3	...	.....	.....	23
ton	16	4	2	3	3	3	5	8	9	4	1	.....	7	65
n	.....	.....	.....	.....	.....	...	...	...	...	...	...	.....	.....	.....
	.....	.....	.....	.....	.....	...	...	...	...	...	...	.....	.....	.....
	.....	.....	.....	.....	.....	...	...	...	...	...	...	.....	.....	.....
on	2	2	.....	1	.....	1	...	1	...	...	...	.....	2	9
ld	.....	.....	.....	.....	.....	...	...	...	...	...	...	.....	.....	.....
ton	.....	.....	.....	.....	.....	...	...	...	...	...	...	.....	.....	.....
pton	.....	.....	.....	.....	.....	...	...	...	...	...	...	.....	.....	.....
oro	.....	.....	.....	.....	.....	...	...	...	...	...	...	.....	.....	.....
d	.....	.....	.....	.....	.....	...	...	...	...	...	...	.....	.....	.....
	180	41	27	40	41	42	34	39	44	18	6	.....	21	533

Deaths in Camden County.

TOWNSHIPS.	AGES.												
	Under 5 years.	5 and under 10.	10 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and under 100.	Over 100.	Ages not reported.	Total.
Camden	415	68	46	53	52	49	46	51	41	43	5	.....	37	906
Centre	11	2	2	6	2	2	1	1	2	2	....	.....	2	33
Delaware	4	2	1	.....	3	.....	1	2	....	1	....	.....	....	14
Gloucester	17	.....	2	3	5	3	2	6	7	4	....	.....	3	52
Gloucester City	15	.....	1	4	4	1	....	2	1	....	....	.....	....	28
Haddon	15	1	4	4	2	1	7	3	4	1	2	.....	2	46
Merchantville	1	3	.....	.....	.....	1	....	....	....	....	....	.....	....	5
Stockton	4	.....	1	1	.....	.....	1	....	1	....	....	.....	1	9
Waterford	16	1	3	2	3	4	2	4	2	2	1	.....	3	43
Winslow	5	.....	1	.....	1	.....	....	2	2	....	....	.....	1	12
	503	77	61	73	72	61	60	71	60	53	8	.....	49	1148

Deaths in Cape May County.

TOWNSHIPS.	AGES.												
	Under 5 years.	5 and under 10.	10 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and under 00.	Over 100.	Ages not reported.	Total.
*Cape May City	....	....	.....	.....	.....	.....	....	....	....	....	....		....	.....
Dennis	3	.....	2	4	2	2	2	4	4	....	....		....	29
Lower	8	11	3	4	1	2	6	2	2	1	....		....	44
Middle	3	3	2	2	1	1	....	....	2	3	....	.....	....	19
Upper	4	.....	3	1	.....	1	3	1	1	1	1	.....	....	16
	18	14	10	11	4	6	11	7	9	5	1	.....	12	108

*No returns.

Deaths in Cumberland County.

WNSHIPS.	AGES.													Total.
	Under 5 years.	5 and under 10.	10 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and under 100.	Over 100.	Ages not reported.	
on	46	3	9	10	10	9	7	17	12	8	3	1	....	135
rcial	8	1	2	3	1	1	1	4	1	1	....	....	2	25
d	5	.....	1	1	.....	1	.....	...	...	...	...	...	....	8
	.....	.....	.....	.....	.....	.....	.....	...	...	...	...	...	....	.....
d	7	1	2	2	4	1	.....	1	3	1	....	....	3	25
ich	7	1	1	1	1	.....	.....	...	1	1	....	....	1	14
ell	5	1	2	.....	4	.....	4	1	9	5	....	1	1	33
	11	10	2	5	5	4	1	2	2	1	....	....	2	45
e River	12	.....	1	1	1	5	2	2	1	...	....	....	....	25
le	46	3	8	13	13	7	5	7	6	2	....	....	9	119
eek	2	2	.....	.....	1	.....	.....	1	...	...	....	....	2	8
rn.	149	22	28	36	40	28	20	35	35	19	3	2	20	437

Deaths in Essex County.

NSHIPS.	AGES.													Total.
	Under 5 years.	5 and under 10.	10 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and under 100.	Over 100.	Ages not reported.	
ille	.....	.....	.....	.....	.....	.....	.....	.....	.....	...	...	...	.....	.....
ield	19	3	3	4	9	5	2	2	4	4	....		1	56
ll	7	5	2	1	3	2	2	6	5	1	....		6	40
	9	4	1	.....	2	1	2	2	2	3	....			28
ange	25	2	3	3	3	2	5	3	6	3	....			55
in	9	.....	.....	.....	.....	.....	4	4	1	....	....			18
ton	1	1	.....	.....	1	.....	3	2	1	....	....			9
n	5	2	1	3	5	2	3	2	5	1	....			30
air	12	1	5	1	4	2	2	7	4	3	....		5	46
	1250	350	253	229	236	202	236	170	118	59	8	2	190	3303
	29	8	4	5	9	13	4	4	2	2	....	....	3	83
range	6	4	.....	3	1	3	3	2	1	1	....	....	.....	26
range	5	1	.....	3	3	1	2	.....	2	1	1	....	.....	19
rn.	1377	381	272	252	276	233	268	205	152	78	9	2	206	3711

Deaths in Gloucester County.

TOWNSHIPS.	AGES.													
	Under 5 years.	5 and under 10.	10 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and under 100.	Over 100.	Ages not reported.	Total.
Clayton	12	1	2	4	1	2	1	4	2	1	.....	.....	...	30
Deptford	4	1	2	1	2	1	1	4	3	.....	.....	.....	...	19
Franklin	6	2	.....	3	3	....	1	4	3	.....	.....	.....	...	12
Greenwich	9	1	.....	2	3	....	1	1	1	.....	.....	.....	3	21
Glassboro	6	1	1	2	3	1	5	3	1	1	2	.....	...	26
Harrison	4	.....	1	...	2	1	2	....	5	3	.....	.....	...	19
Logan	3	.....	2	...	....	1	.....	3	....	1	.....	.....	1	11
Mantua	6	.....	.....	2	....	2	1	2	6	1	1	.....	...	21
Monroe	3	.....	2	...	1	....	.....	....	....	.....	.....	.....	...	6
*Swedesboro	.....	.....	.....	...	....	.....	.....	....	.....	.....	.....	.....	...	....
Washington	1	3	1	....	1	1	1	3	....	.....	.....	.....	6	17
West Deptford	5	1	1	2	....	....	1	2	2	.....	.....	.....	3	17
Woodbury	14	2	1	2	3	2	1	4	5	.....	.....	.....	3	37
Woolwich	6	1	1	3	....	1	1	3	2	1	.....	.....	1	20
*No return.	79	13	14	22	19	12	16	33	30	8	3	.....	17	266

Deaths in Hudson County.

TOWNSHIPS.	AGES.													
	Under 5 years.	5 and under 10.	10 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and under 100.	Over 100.	Ages not reported.	Total.
Bayonne	43	6	4	3	7	4	3	3	6	1	.....	.....	1	81
*Guttenburg	.....	...	.....	.....	...	...	.....	.....	.....	...	...	.....	...	.....
Harrison	44	12	7	10	12	5	6	3	4	2	...	.....	...	105
Hoboken	203	42	29	34	49	27	29	36	19	11	3	.....	...	482
Jersey City	797	102	88	103	07	.04	99	93	76	39	7	...	9	1624
Kearney	7	3	.....	2	1	1	1	1	1	....	...	...	...	17
North Bergen	40	11	4	7	15	10	7	6	3	4	...	...	...	107
Town of Union	25	3	2	4	3	10	2	2	1	2	...	...	...	55
Union	20	7	1	2	1	2	2	6	2	1	...	...	...	44
Weehawken	9	...	1	5	.....	6	.....	.....	.....	....	...	...	...	21
West Hoboken	22	4	.....	2	8	8	2	2	5	2	...	...	...	55
*No return.	1210	90	136	172	203	177	151	152	117	62	11	.....	10	2591

Deaths in Hunterdon County.

NSHIPS.	AGES.													
	Under 5 years.	5 and under 10.	10 and under 20.	20 and under 30.	30 and under 40.	40 nd under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and under 00.	Over 00.	Ages not reported.	Total.
a.....	2	...	3	3	2	1	.....	6	3	1			....	22
ı.....	3	2	2	...	1	1	1	4	..		.....		1	16
.....	6	...	1	...	2	...	1	1	1	1			....	13
.....	2	2	1	2	1	4	3	4	5	6			2	32
ell.....	3	...	1	4	1	1	2	4	3	2			....	21
.....	5	...	1	...	...	2	.....		2	3		.....	1	14
rn.....	2	....	...	...	...	...	.....		3	1		.....	.....	6
lge.....	5	3	1	1	...	2	.....	2	2			.....	.....	16
.....	...	...	...	...	...	...	.....		..	.....	.....	.....	.....	.....
.....	2	....	...	1	1	...	.....	4	6	3	.....	.....	.....	17
ille.....	27	1	1	3	4	1	5	5	5	2	1	1	3	59
.....	4	2	2	1	...	2	.....	1	2	2	1	.....	.....	17
.....	2	1	1	2	1	3	1	2	1	2	.....	.....	.....	16
n.....	3	3	...	1	5	4	1	1	1	3	.....	.....	.....	22
y	2	....	1	1	2	1	6	.....	3	.....	1	.....	.....	17
Clinton.....	...	...	...	...	...	...	.....	.....	.....	.....	.....	.....	.....	.....
.....	...	...	...	...	1	...	.....	.....	3	.....	.....	.....	.....	4
well.....	3	1	3	1	...	...	.....	.....	.....	1	.....	.....	.....	9
	71	15	18	20	21	22	20	34	40	28	4	1	7	301

Deaths in Mercer County.

TOWNSHIPS.	AGES.													
	Under 5 years.	5 and under 10.	10 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and under 100.	Over 100.	Ages not reported.	Total.
Chambersburg	20	10	7	4	2	2	....	1	1	....	....	.....	....	47
*East Windsor	.....	.....	.....	.....	.....	.....	....	....	....	....	....	.....	....	.....
Ewing	3	.....	3	1	.....	.....	....	1	1	....	1	.....	8	18
Hamilton	13	6	8	6	9	5	7	7	6	6	....	.....	2	75
*Hopewell	.....	.....	.....	.....	.....	.....	....	....	....	....	....	.....	....	.....
Lawrence	14	2	3	1	4	3	5	5	2	1	1	.....	1	42
Princeton	6	.....	.....	1	2	3	2	6	4	2	....	.....	1	26
*Trenton	.....	.....	.....	.....	.....	.....	....	....	....	....	....	.....	....	.....
Washington	3	1	3	1	.....	.....	2	2	....	1	....	.....	....	13
West Windsor	1	.....	2	.....	1	1	3	....	2	2	1	.....	1	14
*No return.	60	19	26	14	18	14	19	22	16	12	3	.....	12	235

Deaths in Middlesex County.

TOWNSHIPS.	AGES.													
	Under 5 years.	5 and under 10.	10 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and under 100.	Over 100.	Ages not reported.	Total.
Cranbury	2	.....	.....	3	2	1	3	2	2	1	....	.....	1	17
East Brunswick	21	4	6	2	4	4	7	2	3	3	....	.....	....	56
*Madison	.....	.....	.....	.....	.....	.....	....	....	....	....	....	.....	....	.....
*Monroe	.....	.....	.....	.....	.....	.....	....	....	....	....	....	.....	....	.....
*New Brunswick	.....	.....	.....	.....	.....	.....	....	....	....	....	....	.....	....	.....
North Brunswick	4	2	1	2	.....	.....	....	4	....	2	....	.....	1	16
*Perth Amboy	.....	.....	.....	.....	.....	.....	....	....	....	....	....	.....	....	.....
Piscataway	10	.....	3	1	1	1	2	4	....	....	....	.....	1	23
Raritan	28	6	2	4	4	6	3	7	5	7	1	.....	....	73
Sayreville	4	1	2	.....	.....	.....	1	....	....	....	....	.....	1	9
South Amboy	36	10	3	5	4	6	3	5	2	....	1	.....	....	75
South Brunswick	3	.....	3	4	2	5	1	5	6	1	....	.....	2	32
*Woodbridge	.....	.....	.....	.....	.....	.....	....	....	....	....	....	.....	....	.....
*No return.	108	23	20	21	17	23	20	29	18	14	2	.....	6	301

Deaths in Monmouth County.

SHIPS.	AGES.													
	Under 5 years.	5 and under 10.	10 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and under 100.	Over 100.	Ages not reported.	Total.
.....	3	.....	.....	.....	1	.....	1	.....	.....	.....	.....	.....	...	6
wn	3	2	5	1	3	.....	2	2	2	2	.....	.....	1	22
l	3	.....	2	2	3	2	1	1	.....	.....	.....	.....	...	14
l	.....	.....	.....	.....	...	.....	..	1	.....	.....	.....	.....	...	1
.....	.....	3	3	3	2	.....	..	2	1	.....	.....	.....	3	17
ban	4	2	4	.....	1	2	.....	2	5	1	.....	.....	...	21
ro.....	.....	.....	.....	.....	...	.....	.....	..	..	.....	.....	.....	...	.....
n	13	5	4	3	2	2	6	4	2	2	.....	.....	...	43
town	.....	.....	.....	.....	...	.....	..	..	..	.....	.....	.....	...	.....
ne.....	.....	.....	.....	.....	...	.....	..	..	..	.....	.....	.....	...	.....
.....	.....	.....	.....	.....	...	.....	..	..	..	.....	.....	.....	...	.....
.....	27	7	4	5	4	3	2	3	5	2	1	.....	...	63
bury	.....	.....	.....	.....	...	.....	..	..	..	.....	.....	.....	...	.....
Freehold..	10	1	7	1	2	4	2	4	7	5	.....	.....	4	47
.....	.....	.....	.....	.....	...	.....	..	..	..	.....	.....	.....	...	.....
rn.	63	20	29	5	...	3	4	19	22	12	1	1	8	234

Deaths in Morris County.

TOWNSHIPS.	AGES.													
	Under 5 years.	5 and under 10.	10 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and under 100.	Over 100.	Ages not reported.	Total.
Boonton	5	3	4	1	1	4	1	1	4	...	....	.....	...	24
Chatham	4	..	2	..	..	3	.....	6	5	2	....	.....	1	23
*Chester	.....	..	..	..	..	..	.....	.....	.....	..	....	.....	...	.....
*Hanover	.....	..	..	..	..	..	.....	.....	.....	..	....	.....	...	.....
Jefferson	6	2	2	2	.....	2	.....	..	2	..	....	.....	...	17
Mendham	3	..	1	1	2	.....	1	4	5	...	....	.....	...	17
Montville	3	3	..	...	1	.....	.....	...	3	1	...	.....	...	11
Morris	63	3	7	12	15	13	9	22	14	9	4	.....	10	191
Mount Olive	3	3	1	2	2	.....	3	2	..	....	....	.....	...	16
Passaic	4	..	..	2	1	1	2	2	3	1	1	.....	1	18
Pequannock	3	..	1	4	.....	.....	.....	..	..	1	....	.....	...	9
*Randolph	.....	..	..	...	.....	.....	.....	..	..	....	....	.....	...	.....
Rockaway	27	3	3	4	2	2	2	2	4	....	....	.....	...	49
*Roxbury	.....	..	..	...	.....	.....	.....	..	..	....	....	.....	...	.....
*Washington	.....	..	..	...	.....	.....	.....	..	..	....	....	.....	...	.....
	121	27	21	29	24	25	18	40	40	14	5	.....	12	376

*No return.

Deaths in Ocean County.

NSHIPS.	AGES.													Total.
	Under 5 years.	5 and under 10.	10 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and under 100.	Over 100.	Ages not reported.	
ey	1	3	2	2	1	.....	1	2	2	3	.....	.....	.....	17
.....	.....	.....	...	.....	...	.....	.....	...	...	.....	.....	.....	.....	.....
.....	17	8	5	6	7	1	3	3	3	3	.....	.....	.....	56
swood	.....	.....	...	.....	...	.....	.....	.....	...	.....	.....	.....	.....	.....
on	.....	.....	...	.....	...	.....	.....	.....	...	.....	.....	.....	.....	.....
.....	.....	.....	...	.....	...	.....	.....	.....	...	.....	.....	.....	.....	.....
ester	7	4	3	.....	2	.....	.....	1	1	....	.....	.....	.....	18
.....	.....	.....	...	.....	...	.....	.....	.....	...	.....	.....	.....	.....	.....
ed	19	2	1	3	4	.....	.....	2	3	1	.....	.....	.....	35
l	4	1	1	1	...	.....	.....	.....	2	2	.....	.....	.....	11
.....	6	.....	1	4	1	.....	1	.....	1	2	.....	.....	.....	16
rn.	54	18	13	16	15	1	5	8	12	11	.....	.....	.....	153

Deaths in Passaic County.

NSHIPS.	AGES.													Total.
	Under 5 years.	5 and under 10.	10 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and under 100.	Over 100.	Ages not reported.	
kanonk	3	2	1	...	.....	2	...	2	3	.....	...	.....	.....	13
Falls	.....	.....	.....	...	.....	.....	...	...	...	...	...	.....	.....	.....
ester	.....	.....	.....	.....	.....	.....	...	...	...	...	...	.....	.....	.....
c	.....	.....	.....	.....	.....	.....	...	...	...	...	...	.....	.....	.....
n	462	120	52	69	60	50	39	40	44	5	7	.....	26	984
n	5	.....	1	.....	1	2	...	1	6	2	.....	.....	1	19
.....	4	.....	.....	.....	.....	.....	2	3	2	3	.....	.....	.....	14
ilford	4	2	.....	1	.....	.....	...	2	6	...	1	.....	.....	16
rn.	478	124	54	70	61	54	41	48	61	20	8	.....	27	1046

Deaths in Salem County.

TOWNSHIPS.	AGES.													
	Under 5 years.	5 and under 10.	10 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and under 100.	Over 100.	Ages not reported.	Total.
*Elsinboro	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lower Alloways Creek	4	.....	1	1	.....	.....	.....	1	2	.....	.....	.....	.....	10
Lower Penns Neck	4	.....	1	4	1	1	3	.....	1	2	.....	.....	.....	17
Mannington	10	1	.....	4	5	1	2	3	1	3	1	.....	3	34
Pilesgrove	12	2	3	6	6	3	4	8	3	2	1	.....	12	62
Pittsgrove	4	.....	1	5	2	1	.....	2	2	1	.....	.....	4	22
Quinton	2	.....	1	2	.....	.....	1	.....	.....	.....	.....	.....	.....	6
Salem	13	1	3	9	2	4	5	7	4	3	2	.....	.....	53
Upper Alloways Creek	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Upper Penns Neck	10	4	1	8	3	2	2	2	2	1	.....	.....	10	45
Upper Pittsgrove	5	1	1	1	3	.....	.....	.....	2	3	.....	.....	1	17
*No return.	65	9	12	41	23	12	17	25	17	15	4	.....	20	270

Deaths in Somerset County.

TOWNSHIPS.	AGES.													
	Under 5 years.	5 and under 10.	0 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and under 100.	Over 100.	Ages not reported.	Total.
Bedminster	8	.....	2	4	1	1	5	5	7	...	...	.....	2	33
Bernards	5	1		4	5	4	4	4	4	...	...	.....	1	32
*Branchburg	.....	.....	.....	.....	.....	.....	...	...	...	...	...	.....	...	...
Bridgewater	24	9	8	10	13	10	9	8	6	5	...	.....	1	103
Franklin	11	5	2	3	.....	4	3	5	2	3	1	.....	...	39
Hillsborough	12	1	2	4	2	2	3	3	6	7	1	.....	1	44
Montgomery	10	.....		2	4	.....	2	...	6	1	...	.....	...	25
North Plainfield	8	.....	2	2	1	1	2	4	3	...	...	.....	2	53
Warren	4	.....	2	2	.....	.....	...	...	3	1	...	.....	...	12
*No return.	82	16	19	31	26	22	28	29	37	17	2	.....	7	391

Deaths in Sussex County.

HIPS.	AGES.													
	Under 5 years.	5 and under 10.	10 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and under 100.	Over 100.	Ages not reported.	Total.
.....	3	1	.....	...	2	1	...	1	2	.....	.....	.....	...	10
.....	2	2	1	3	3	...	1	1	1	1	.....	.....	1	16
.....	14	2	2	1	1	3	2	6	6	2	.....	.....	...	39
.....	3	4	1	...	...	2	..	2	1	.....	.....	.....	...	13
.....	.....	.....	.....	...	...	...	..	...	...	.....	.....	.....	...	.....
.....	.....	.....	1	...	...	...	..	...	...	.....	.....	.....	...	1
.....	.....	.....	.....	...	...	...	...	...	...	.....	.....	.....	...	.....
.....	.....	.....	.....	...	1	...	...	...	2	1	1	.....	2	7
.....	.....	.....	.....	...	...	...	...	...	...	.....	.....	.....	...	.....
.....	.....	1	.....	...	1	1	...	...	1	.....	.....	.....	...	6
.....	6	3	5	4	2	1	...	2	6	5	.....	.....	1	36
.....	4	1	...	2	1	1	...	2	2	1	.....	.....	3	19
.....	.....	.....	.....	...	...	...	...	...	...	.....	.....	.....	...	.....
.....	4	.....	...	2	1	1	2	4	...	1	.....	.....	...	15
.....	8	4	3	3	...	2	2	1	2	2	.....	.....	...	27
	44	18	15	16	12	12	9	19	23	13	1	.....	7	189

Deaths in Union County.

TOWNSHIPS.	AGES.												
	Under 5 years.	5 and under 10.	10 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and under 100.	Over 100.	Ages not reported.
*Clark	.....	.....	.....	.....	.....	.....	.....	...	...	...	.....	.....	....
*Cranford	.....	.....	.....	.....	.....	.....	.....	...	...	...	.....	.....	....
Elizabeth	418	45	43	59	60	67	64	59	25	5	.....	.....	1
Fanwood	2	.....	.....	.....	.....	.....	.....	...	...	1	.....	.....	....
Linden	.....	2	1	1	.....	.....	1	...	...	1	.....	.....	....
*New Providence	.....	.....	.....	.....	.....	.....	.....	...	...	...	.....	.....	....
Plainfield	16	5	5	6	6	5	9	12	1	3	.....	.....	....
Rahway	44	7	4	7	7	10	12	10	15	3	1	.....	
Springfield	.....	1	.....	.....	2	.....	.....	2	2	1	.....	.....	
*Summit	.....	.....	.....	.....	.....	.....	.....	...	...	...	.....	.....	...
Union	13	1	.....	1	.....	.....	1	1	4	2	.....	.....	...
Westfield	9	6	3	3	2	.....	2	1	2	...	.....	.....	
*No returns.	502	67	56	77	77	82	89	85	49	16	1	.....	

Deaths in Warren County.

TOWNSHIPS.	AGES.													
	Under 5 years.	5 and under 10.	10 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and under 100.	Over 100.	Ages not reported.	Total.
Allamuchy	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	.....	.....	6	10
*Belvidere	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Blairstown	3	3	1	.....	.....	.....	2	2	.....	3	.....	.....	.....	15
Franklin	.....	.....	2	.....	.....	.....	1	.....	2	.....	.....	.....	4	9
Frelinghuysen	3	1	1	.....	2	.....	.....	.....	.....	3	.....	.....	.....	10
Greenwich	8	.....	2	2	2	2	3	5	2	1	.....	.....	2	27
Hackettstown	5	2	.....	2	6	4	1	.....	1	.....	.....	.....	.....	21
Hardwick	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	1	.....	1	4
Harmony	5	.....	.....	.....	.....	.....	1	2	1	3	.....	.....	.....	12
Hope	2	.....	1	2	1	1	3	.....	3	.....	.....	.....	.....	13
*Independence	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Knowlton	3	2	1	2	2	1	1	2	1	2	.....	.....	.....	17
Lopatcong	2	1	3	2	1	1	1	1	1	.....	1	.....	.....	24
Mansfield	5	2	3	5	2	1	3	4	1	4	1	.....	3	34
*Oxford	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pahaquarry	1	.....	.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	3
*Phillipsburg	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Town of Washington	7	.....	2	1	.....	.....	.....	.....	.....	1	.....	.....	.....	11
Washington	2	.....	1	.....	.....	.....	.....	3	3	3	.....	.....	1	13
*No return.	56	11	17	16	16	10	16	20	17	24	3	.....	17	223

RECAPITULATION.

DEATHS IN THE SEVERAL COUNTIES.

COUNTIES.	AGES.													
	Under 5 years.	5 and under 10.	10 and under 20.	20 and under 30.	30 and under 40.	40 and under 50.	50 and under 60.	60 and under 70.	70 and under 80.	80 and under 90.	90 and under 100.	Over 100.	Ages not reported.	Total.
Atlantic.....	64	13	12	11	14	11	10	13	11	6	1	...	17	183
Bergen.....	105	23	18	27	25	21	28	26	23	15	5	...	23	339
Burlington.....	180	41	27	10	41	42	34	39	44	18	6	...	21	533
Camden	503	77	61	73	72	61	60	71	60	53	8	....	49	1148
Cape May.....	18	14	10	11	4	6	11	7	9	5	1	...	12	108
Cumberland ...	149	22	28	36	40	28	20	35	35	19	3	2	20	437
Essex	1377	381	272	252	276	233	268	205	152	78	9	2	206	3711
Gloucester.....	79	13	14	22	19	12	16	33	30	8	3	...	17	266
Hudson	1210	190	136	172	203	177	151	152	117	62	11	...	10	2591
Hunterdon.....	71	15	18	20	21	22	20	34	40	28	4	1	7	301
Mercer.....	60	19	26	14	18	14	19	22	16	12	3	...	12	235
Middlesex.....	108	23	20	21	17	23	20	29	18	14	2	....	6	301
Monmouth.....	63	20	29	15	17	13	14	19	22	12	1	1	8	234
Morris.....	121	27	21	29	24	25	18	40	40	14	5	...	12	376
Ocean.....	54	18	13	16	15	1	5	8	12	11	...	...	.....	153
Passaic	478	124	54	70	61	54	41	48	61	20	8	...	27	1046
Salem	65	9	12	41	23	12	17	25	17	15	4	...	20	260
Somerset.....	82	16	19	31	26	22	28	29	37	17	2	...	7	316
Sussex	44	18	15	16	12	12	9	19	23	13	1	...	7	189
Union	502	67	56	77	77	82	89	85	49	16	1	...	34	1135
Warren	56	11	17	16	16	10	16	20	17	24	3	...	17	223
	5389	1141	878	1010	1021	881	894	959	833	460	81	6	532	14095

INDEX.

Page.

eration of foods 15
ol and tobacco 84
ils, their diseases 25
al vaccine 115, 122
ious fever 156
iation, Sanitary 9, 25, 123
and death records 14
e, J. L., M. D 130, 139
ett, C. F., Ph. D 33–47
rhal fever 157
plague 157
s of local outbursts of disease 11
s of Jamesburg fever 49–65
s and fever 157
ns 87, 129
ology 27
George H., Prof 126
s, J. C 149
vall, H. B., E. M 17, 87–102
ry sickness from soil and water pollution 99
inal insane, disposition of the 22, 33–47
is, L., M. D 67–85
theria 9
ses of animals 25
ses not epidemic 7
iage 142
ding water 87
ic fever at Jamesburg 23
otic influenza of horses 160
otics of cattle 152
..... 161
s 101
and mouth diseases 156
lers 161
astics 7, 145
ness of water 88
rs, diseases of 67
ng apparatus 57, 138
lity 83
ry of vaccination 106

Page.
Horses, diseases of..... 160
Hove..... 160
How to vaccinate..... 127
Hunt, E. M., M. D.....33-47, 49-65, 123-148
Hygiene, School.....134, 137
Ice water..... 109
Illuminating oils..... 16
Infective diseases..... 6
Influenza..... 160
Inoculation..... 165
Insane criminals..... 22, 33-47
Interrupted water supply..... 164
Jamesburg, Fever at..... 9, 10, 49-65
July, facts as to climatology..... 29
Kerosene..... 18-21
Law as to vital statistics..... 12
Lead poisoning..... 89, 101
Leeds, Prof. A. R..... 140
Malaria..... 7, 126
Marriages, births and deaths..... 12
Marsh, E. J., M. D..... 103-124
Members of State Board of Health..... 3
Mercurial diseases of hatters..... 88
Meteorological observations..... 27
Meteorological records..... 167
Milk as causing fever..... 9, 10
Montclair, fever at..... 9
New Jersey Sanitary Association..... 9, 25, 123-148
Notes on kerosene..... 17-21
Offensive trades..... 12
Oils, illuminating..... 16
Osborne, E. A., C. E..... 3
Papers furnished, list of..... 22
Passaic water supply..... 125, 130
Periodic fever..... 7, 8
Physical training..... 145
Physicians, duties of..... 13
Prevention of imported diseases..... 159
Preventive treatment..... 8
Private nuisances..... 11
Prominent diseases..... 7
Prophylactics..... 8
Registry law..... 12
Remittent fever..... 7, 8
Report of the secretary..... 5
Ridge, J. M., M. D..... 3
Rights of Artisans..... 23
Rinderpest..... 157
Sanitary Association of New Jersey..... 9, 25, 123

Page.
ıygiene..... 134, 137
accination..... 25
nd sewerage..... 24, 56, 131, 142, 144, 147
x..... 24, 104
lth..... 7, 135
islation..... 122
dicine..... 6, 7
us Filaria..... 158
..... 9
ture..... 173
ver..... 155
and alcohol..... 84
influenza..... 163
fever..... 9, 49–65
ion..... 24, 103–122
T. R., M. D..... 3
ry science..... 25
tistics..... 12, 130, 139, 144
losets..... 55, 59
ıpply..... 87
ıpply, defective..... 53, 59–61, 140
ıpply, interrupted, New Village..... 26
..... 87, 129
ıshbel, C. E..... 131
ad, Hon. Wm. E..... 28
eather, rain and snow reports..... 70, 168
ever..... 5, 6

Addenda.

The paper on Sewers is postponed until the next report.

In description of map, page 58, omit E, line 22, and E, line 1

[redacted]

THIRD ANNUAL REPORT

OF THE

BOARD OF HEALTH

OF THE

STATE OF NEW JERSEY

1879.

CAMDEN, N. J.
SPEAKMAN & SHAW, PRINTERS.
1880.

THIRD ANNUAL REPORT

OF THE

BOARD OF HEALTH

OF THE

STATE OF NEW JERSEY

1879.

CAMDEN, N. J.:
PRINTED BY SINNICKSON CHEW.
1879.

STATE BOARD OF HEALTH.

. HENRY C. KELSEY, Secretary of State, } Members Ex-Officio.
. JOHN P. STOCKTON, Attorney General, }

	P. O. Address.
DENNIS	Newark.
F. BRACKETT	Princeton.
M. RIDGE	Camden.
ORE R. VARICK	Jersey City.
M. HUNT	Metuchen.
OSBORN	Middletown.
LEEDS	Hoboken.

nt	T. R. VARICK.
ponding Secretary	EZRA M. HUNT.
ing Clerk	E. A. OSBORN.

REPORT OF THE SECRETARY OF THE BOARD.

To His Excellency, George B. McClellan,

GOVERNOR:—The State Board of Health of the State of New Jersey begs leave to make report to your Excellency as follows:

The year which has just closed has been one of increased activity for this Board. Our citizens are realizing more and more that the public health is a great material interest over which the State must exercise oversight. Many of the causes that affect the physical condition of the population are within the sphere of its control. The sickness and death rate of the population are greatly influenced by localities, surroundings, density, modes of living and other circumstances. Social conditions, in the common interests of the citizen, need the advisory or regulative concern of the governing authorities. The State must acquaint itself with the avoidable burdens which localities, employments, conditions and circumstances cast upon the citizens, and study the relations of the individual so far as they most deeply concern the public welfare. The recognition of this principle led to the formation of a Health Board. Each year has thus far accumulated new evidence of its importance, while evidence of its appreciation by the people is afforded by the increasing calls upon it for information and advice.

The past year has been one exempt from any wide-spread epidemic. As far as inference can be made from the general reports of sickness in previous years, it is believed to have been a period of unusual health.

The report of the Board last year in reference to the epidemic of typhoid fever at Jamesburg, as well as the report of the Trustees as to existing defects led to an appropriation by the Legislature which provided for important changes as to sewerage, drainage and water supply, as well as for better hospital accommodations and an increase of apartments, so as to prevent over-

crowding. Your Excellency, in March last, directed the Board of Health to put itself in communication with the Superintendent and Trustees of the School, so as to advise with them in reference to improvements deemed desirable. We are glad to be able to report that a thorough reconstruction has been carried out; that a new family house has been erected: a hospital building provided, a new water supply secured, and such precautions taken as we trust will prevent the recurrence of any such preventible disease as afflicted the institution the last year. While the plans and work have necessarily been executed under the supervision of special architects and engineers, the sanitary views of the Board were adopted so far as financial resources would permit.

As the Legislature last year appointed a commission to consider what general laws could be advised for the government of cities, the Board of Health responded to an invitation to appear before the commission and present arguments for general laws and ordinances, which should secure to every city or borough a Board of Health, with such powers as would enable it to exercise needed jurisdiction where the public health was imperilled.

As we have examined into the health codes of our cities and became aware of the entire absence of any well-regulated sanitary administration in many of them, we have been convinced of the need of such legislation as is already fully sustained in other States and cities, and as should be required in all towns upon which municipal privileges are conferred. The commission seemed fully alive to the need of some action and have the whole subject under careful advisement.

As a part of this report will be found the letter presented to the Commission by the Board.

The Board is able to record with pleasure the evident increase of interest there is among the people at large in sanitary affairs. The discussion that is now taking place as to the best methods to be used, the frequent articles in the public press, the formation of voluntary associations in some of our cities, indicate that the people are becoming sensitive about this great social and State interest. The circulation of the Health Reports has been quite general through the State, and the demand for them is upon the increase.

During the summer it was thought necessary to issue a Health Circular, addressed to householders, city authorities and boards of health. (See Appendix.) It sought within a brief compass not only to give advice, but to direct as to methods for improving household and other local conditions, and to give in precise form directions as to the use of those alteratives or disinfectants which might be needed. This circular by thousands has found its way into the families of the State, and we have occasion to know it has been serviceable as a ready directory in some of the details of health administration.

SANITARY APPLIANCES.

In household administration and in the necessities of congregated life, as found in cities, very many appliances are needed in connection with the care and delivery of household offaling and debris. Drainage, sewerage and water-carriage devices, filters, traps, earth closets, ventilators, disinfectants, represent a few of the hundreds of articles offered to expedite household or municipal delivery in the interests of the public health. These inventions have become so numerous in England that a great sanitary exhibit is held each year, lasting ten days, and attracting large attention, because of the advantage it affords for examining sanitary contrivances, and testing and comparing their merits and securing the opinions of experts in regard to their value. The State Board of Health, believing that such an exhibit would be of great service to our citizens in connection with the annual fair of the State Agricultural Society, proposed a plan to its officers, which was accepted. The display this year, although not large, was regarded as very satisfactory. Plans have already been entered upon to secure a large competition and display for the coming year. An exhibit of the most valuable appliances in use in Great Britain will be secured. As a means of informing the people of the State as to what is desirable in this line, this exhibit cannot but come to be highly appreciated. The officers of the State Fair have kindly provided premiums, and have shown a zeal in oversight and co-operation for which they deserve the thanks of our citizens. It is the intention of the Board to collect also a museum of sanitary appliances, for permanent retention at the State House, so that our citizens may have access to the best models in sanitary inventions. Donations have already been

made, a room provided, a valuable library is also being gradually collected by the Board, which will be accessible to citizens of the State, and add to sanitary information.

EPIDEMICS.

The year has not been marked by any increase of epidemic influences in New Jersey. Our country has again been visited by the epidemic which last year so stirred our sympathy and affected our national interests. There are few evils without some suggested or associated good. Much of our progress in sanitary administration has resulted from the distressing and expensive experience of some invading scourge. It has been said that no great outbreak of disease has been allowed to pass away without giving a new impulse to sanitary measures. This has been realized in our own country in the formation of a National Board of Health, and in active local measures in various States for facilitating the control of disease and dealing with the causes which deteriorate the public health. It is a fact well known to sanitarians that yellow fever this year was held in check and confined to localities only by the most rigid isolating methods. The feasibility of such antecedent, timely activity, has been fully vindicated. New evidence is afforded in favor of this ever-vigilant care which can prevent or limit so many of human ailments. The country does not yet know how much it owes to the co-operation of the National and of Health Boards in limiting this great plague, as well as in devising methods which are silently and effectively being put in operation for the closer scrutiny of preventible diseases. Our own State records but a single case of yellow fever for the year, and that in the person of a non-resident. The State Board of Health took early precaution to provide for any case of exposure which might arise. Through the ready co-operation of your Excellency, our cities were apprised of the disposal that could be made of any reported case, if no local provision had been arranged.

The Quarantine authorities of New York consented to the transfer by their own Hospital boat of any case found within our territorial limits, at a cost merely covering actual expense. Our thanks are due to the Commissioners and to the Physician of Quarantine for the facilities afforded, and for their prompt transfer in the case which occurred. Due precautions were also

taken at Perth Amboy, and other points where yellow fever once prevailed.

It had been the intention of the Board to continue its report upon the diseases of animals. The Legislature however at its last session made temporary special provision as to diseases of cattle. There should be some permanent State oversight as to the diseases of all animals, rendered all the more important by the "fictitious facts" which so innocently and easily accrue from the present low state of veterinary science and art in our State. As it is still made the duty of this Board to have oversight of the great interest, we shall hope to aid in the prevention and limitation of the diseases of all animals by a close system of analysis and inquiry.

SANITARY NEEDS OF LOCALITIES.

During the year our advice has been sought in several places as to local sanitary measures and the best methods of procedure. In some of our cities the civil authorities have been making careful inquiries into actual conditions as preliminary to future advisement and wise administration.

The great embarrassment to effectual work has been an absence of such accurate vital statistics as shows the comparative death rate, and where continuous exceptional degrees of sickness from year to year indicate insanitary conditions. There is besides often a want of recognized and efficient agents to carry out any systematic work of sanitary reform, as well as absence of a precise intelligence as to methods.

In order to any effective movement or administration, there must first be a conviction on the part of the leaders of public sentiment of the actual existing insanitary state, of the possibility or feasibility of its correction, and a confidence in the agency through which it is to be effected.

In parts of cities the insanitary condition is demonstrated by observation, but the facts in detail can only be shown by accurate house to house inspections as well as street examination.

Dr. Farr, of the Registrar General's Office, of England, recently showed from the record of five hundred and ninety-three registration districts of England and Wales, extending through a period of ten years, that the yearly mortality of rural

districts, with one hundred and sixty-six persons to the square mile, was seventeen per thousand, while with a population of sixty-five thousand eight hundred and twenty-three to the square mile, the yearly mortality was not less than thirty-nine per thousand. A similar comparison for five years, by Dr. Russell, of Glasgow, as to Scotland, shows similar results. Still further he compares different parts of the same city of Glasgow, which shows a death rate of nineteen per thousand in the healthiest district, with a density of thirty-five per acre, with a death rate of forty-five per thousand in another district, with a density of five hundred and twelve per acre. It is also shown by the former death rate of nineteen per thousand how it is possible, with a reasonable degree of density of population, to bring down the average of a well-kept part of a city, since "the contrast is greater between the healthy and the unhealthy parts of Glasgow than between Glasgow as a whole and the open country; or, to put it in another way, you have even within the municipality of this city twenty-three thousand people, whose mean annual death rate for five years was only two above that of the rural population; yet a few hundred yards from these very people you find eighty thousand whose mean annual death rate, during the period of these same years, ranged from thirty-five to forty-five per thousand. Now, whatever may underlie this fact, it proves this, that it is not the situation, the soil, the climate, or any other physical circumstance common to the whole area, which produces this high death rate. In short, whatever the cause or causes may be, * * * they are not necessary, and therefore our condition is not absolutely hopeless, but eminently hopeful." This is equally true of contrasts which we will yet cause to appear between city and country, and even between different parts of this State, where there are other modifying conditions beside density of population. It is of great importance that while we are comparing country and city, and our cities with each other, that the local authorities should be comparing each part of their own municipalities by wards and districts, so as to learn the relative death and sickness rate, and be able to locate and deal with the non-essential breeding places of disease. With these and other equally significant facts, the people will come to to inquire for methods of prevention. As to these science, art and experience are so demonstrative, and such tabulated and

authenticated improvement of health have been secured as to make indisputable the feasibility of the undertaking.

The corrections to be made are only to a limited degree within the sphere of individuals. Officials whose intelligence and integrity can be trusted, and laws and ordinances giving adequate authority and jurisdiction are the most pressing demand. The matter belongs to the State and to the local governments, because it concerns the citizens in their most intimate relations. As such it must be reached by authority. If only we first find out what ought to be done and how to do it, there is no department of conferred power which is so likely to be administered faithfully and to be eventually recognized as economic and valuable.

The burden of unchecked disease and prevalent avoidable sickness on the one hand, and on the other hand the "dabs" of sanitation by which jobbery has been permitted to take the place of well-conceived, well-executed economical improvements, are alike to be avoided. But lessons as how not to do a thing, are never to lead to the inference that a thing ought not to be done. Gathering wisdom from the past we are now prepared considerately to proceed to plan both for the present and the future, and to execute with all the clearness and economy of method which the vital and financial interests of the citizens alike require.

We refer to the report of Vital Statistics for evidence as to the need in which many localities stand of better sanitary administration. We have been waited upon by citizens of Jersey City, Hoboken, Newark and New Brunswick as to the need of more active administration and greater attribution of sanitary power. We have evidence that other cities are suffering from the want of clearly defined powers and systematic cleansing. Complaints also come from country districts that there are no laws adequate to the removal of admitted nuisances.

In a few cases, nuisances have been brought to our attention, which by advisement we have been able to assist in limiting or abating.

An appeal from citizens of Millstone, as to the wastes of a distillery, was responded to by the Board. The nuisance was found to be of an extended character. When we came to confer with the proprietors we found them regretting the complicating circumstances which had caused it, and ready to co-operate with

us in methods of relief. The evil, however, illustrated necessity of some general enactment to reach such cases, as we not always be sure of the success of argument and presen facts. Odors injurious to health, generally become most into able and dangerous during the heat of summer, when gr juries and courts are not in session, and when, therefore, the does not admit of abatement by indictment and civil pro Such evils are wisely placed under the summary jurisdic of Health Boards whose knowledge and judgment are the g antee that large powers will not be abused, but will be stri used in necessary defence of the public health.

SEA-SIDE RESORTS.

The Board still has occasion to express some anxiety as to sanitary provision and preparation, in respect to the new increasing cities along our sea-coast line. In the present vance of sanitary knowledge these new and crowded settlem have no excuse for merely tentative measures, while the w which should be done is so much easier than when the land have been covered with buildings. Even the summer tent, v its crowded occupancy and its possible untidiness, and the c tinuous camp meetings of various kinds, need sanitary discipl The water supply must be excellent and the refuse of life n be disposed of by exact art. In a sandy soil too much relia is generally placed upon the ready disappearance of water f the surface and the assumed natural purity of the wells. Bu is to be remembered that there is an absence of ready vegeta to consume the decaying materials, and that sand is not ne so good a percolator as it seems to be. Sandy spots like Savan often mislead in this regard. Some time since the death Northampton, England, ranged at forty-one in one thousand

Dr. Hunter, the Health Officer, in accounting for it, says: this spongy sandstone, cess-pools once made are made and clo they are hardly ever cleaned out and are always nearly em The meaning of this is that the ordure infiltrates all aro far and near, and their gases exhale from the surface." dependence is upon well-water. "None of the cess-pools v cemented, and indeed it is a principle with the Northam builders that the cess-pool needs no drain so absorbent is

stratum. This is a fatal convenience, which may to some account for the great development of fever in the sand-ounties."

ı wells sunk to an unusual depth in such a soil are found ıme contaminated by surface juices. We notice with in-hat bored and artesian wells are being sought for water in many districts. Yet there is need to consider that cal structure and surface conditions modify the sanitary ance of the number of feet.

he sea-shore is a resort for invalids, persons or families o thither when being attacked, or when just convalescent ommunicable diseases. Especial precautions need to be st there are local conditions which may give extension to nfections. This subject has attracted large attention at h watering places by the occasional outbreaks of disease have occurred. Large hotels unoccupied in winter may ɜ more easily become the resorts for summer disease. ɔt enough that honest owners inspect and assure of their ion. Sanitary inspection is expert work, and the services nitary engineer is often needed.

SMOKE AND STENCH NUISANCES.

plaint continues to be made of the emission of smoke ıctories laden with organic material and other sources of ty connected with glue, bone-boiling, pouderette, render-d other factories. A perfect furnace should send out only le carbonic dioxide, a little acid and vapor, and a few f ammonia. "Smoke is the result of distillation with combustion of the product." In a usual furnace we . process partly of combustion and partly of distillation, n contaminated smoke we have not merely noxious gases, consumed fœtid organic particles scattered through the 'o all this is added the gases and particles of decay which itted from the material on hand, and from the saturation buildings and all that appertains thereto. All such tainted not fit for breathing, while there are abundant facts show that like all other filth it affords a ready fertiliza-filth diseases. That all are not affected, or that some ɜ acclimatized proves no more than is proven when some ınd cholera or yellow fever.

Our attention needs to be directed to such nuisances, because to Bayonne and Elizabethport, and to the district as far as Newark, at Camden and other points, such factories resort, being driven out of larger cities on account of their unhealthfulness and the discomfort they cause. We need not refuse such industries, but we must bring them into conformity to laws which will prevent this injury to health, and a nuisance to all lines of public travel, as well as to the residents in the vicinity. Ballard and other authorities have shown how fully most of the evils of offensive trades can be obviated, how the smoke and odor nuisance can be abated, if only the owners will incur the additional expense of new and effective machinery for smoke consumption, and for the absorption of organic matter, and put them in the charge of competent stokers. Our authorities must insist upon the abatement of these evils which are already hazardous to health, and so disturb the senses as to convert discomfort into positive nuisance and jeopardy of health. English law no longer exacts proof that foul smoke or organic particles, or the gases of decay in a given case destroy life, but rather accepts the general fact of their deletrious nature. Besides both in a sanitary and civic view the public have a right to be protected from such evils as by common consent are regarded as nuisances, when they are the results of systematic methods, and abridge the comfort of the people in their homes or on the thoroughfares. Common law arises out of common rights, and should fully meet such cases as these.

SANITARY SURVEY—INSPECTION.

It was early the sentiment of this Board that it is desirable to select some city or thickly settled and exposed portion of the State for a precise method of sanitary survey and examination, so that we could furnish an example of thorough sanitary inquiry, and at the same time secure facts and statements with the precision which is characteristic of exact sanitary research into the causes and prevalence of disease.

Our attention was early directed to Hudson county, which by reason of its locality, its exposure, its recorded death rate and its massed population, evidently stood in need of special sanitary inquiry. It has a County Health Board which would gladly do

ıre if it had requisite financial appropriations, and City Boards ognizing the need but crippled in resources. It thus became ːessary for us to seek out feasible methods for conducting the ˈestigation which is recognized by all local health authorities desirable.

Availing ourselves of a local committee, which, under the ıpices of the New Jersey Sanitary Association, but without ıds, had been making some inquiry as to the soil, drainage and ɾerage of certain sections of Jersey City and Hoboken, and in ir relations to the death rate, this Board, by an appropriation fifty dollars, so aided and supplemented this work, as to secure ıps that will be important for permanent sanitary reference. t it was apparent, that it is impossible for any voluntary comttees to do the work needing to be done in such a large and pulous locality. The insanitary condition of this section, not ly affects its inhabitants, but by its intimate relations to New ɔrk Bay and Harbor, and to the inter-state travel as repreıted in the termini of great trunk railroad lines, involves e interests of commerce and internal traffic, and affects e nation at large. We therefore felt authorized, under e act of Congress creating a National Board, to ask a small ɔpropriation to enable us to carry on a work for which no fficient State or local aid could readily be secured. The Naɔnal Board responded to our application, and under the supertendence of the New Jersey State Board of Health, a sanitary rvey and inspection of the shore line and adjoining districts being carried on. The services of skilled engineers have been ːured, on terms that make them participators in the benefince of the undertaking. The survey and investigation comand the interests of the County Board, the local City Boards the voluntary sanitary associations of the county, and of private ɨizens.

Already, the persons appointed to the work have made comendable progress. By another year we hope to be able to prɑt such an outline of facts and such a method of inquiry as ll commend itself as a model. Just such survey and inspecɔn is needed in several of our cities as preliminary to sanitary ministration that must be provided in the near future. Each ɣ needs an underground and contour map which shall show ıl, drain, sewers, connections, excavations, etc., as also the in-

equalities, grades, constructions and embarrasments of the surface and thus a close knowledge of all "building and house" conditions, such as shall enable them in the future to have ascertained facts in possession as the foundation of judgment, and of plans of execution, when public opinion, or the governing authorities, shall vote the evils too threatening or too burdensome to be longer endured.

It is just such work as this, connected with a careful return of vital statistics, that has been of such admitted usefulness in England, the evidence being diminished sickness, diminished death rates, greater prosperity and acknowledged recognition by the people of the benefits accruing. The Registrar General's Reports have for many years past given quarterly and annual statements of death rates in various parts of the Kingdom, with comparisons of localities as to insanitary conditions, and tables showing the results of sanitary works through a series of years, at numbers of places, sufficient to eliminate sources of error which might arise from temporary increase or decrease, or from limited areas. While density of population tends to increase the death rate, it has often been shown that there are compensatory methods of reduction, so that the death rate of most towns may be kept much lower than it really is. In illustration we quote from some of the quarterly and annual reports of General Graham, Dr. Farr and Dr. Russell. If the mortality of towns had been at the same rate as the mortality in the other districts, the deaths (for the quarter) would have been upwards of seventeen thousand fewer than they were. What was the cause of the great destruction of life? Evidently the violation of the plain, natural laws of life. * * * The intelligent classes of this country will, however, never acquiesce in the continuance of its present imperfect sanitary condition, and the resulting diseases which it brings down upon the heads of the population."

"The mortality of the districts in which the sanitary conditions are the least unfavorable, can be employed as the standard measure until happier times supply the real standard of vitality. Sixty-four districts in various parts of the country are found where the mortality of the people ranged, on an average extending over ten years, from fifteen to seventeen deaths in one thousand living. This is not accidental. The mortality only fluctuates in such places slightly from year to year, and the

ıth rate under the same circumstances will not be exceeded. * * Here we stand upon the actual. Any deaths in a ıntry exceeding seventeen in one thousand annually, are un-ıural deaths. If the people were shot, drowned, burned, poi-ıed by strychnine, their deaths would not be more *unnatural* ın the deaths wrought clandestinely by disease in excess of the ota of natural death. But it may be said that this standard ınot fairly be applied to determine the excessive mortality of ge towns, which can never become so healthy as the country. ıw healthy towns may become we do not know. It is only ıved that the population of parts of many towns experience a ırtality little above the natural standard, and that the preva-t diseases are referable to causes which evidently from their ıure admit of removal." Graham states the number of deaths the United Kingdom at about six hundred and sixteen thou-d, and the number constantly sick is about twice the number annual deaths, or one million two hundred thousand and rty-two. "One hundred and forty thousand of them die ry year unnatural deaths, and two hundred and eighty usand are *constantly* suffering from actual diseases which do prevail in healthy places." Most of our American cities and small portions of well-populated country in the United States l in our State, show a higher death rate than that upon which ı statement is founded. (See Fig. 69.)

Ve hope it will yet be said of the cities of New Jersey as ıham said of London: "The improvement has proceeded step step with the amendment of the dietary, the drainage of the on which the houses stand, the purification of the water which people drink; with the sweetening of the air, and with the gress of medical science, which is the source of sound sani-y doctrines, and all further progress is in the hands of the ple. They can work out their own salvation with God's bless-. The causes of disease are numerous; but every one that hitherto been discovered can be to a certain extent controlled." Russell in his admirable lectures of this year on the "Pre-ıtion and Control of Infectious Diseases," gives many similar s and illustrations.

n 1869 Registrar Graham says: "The large amount of pre-tible mortality has frequently been alluded to in these reports, the statement sometimes has all the freshness of novelty.

As an illustration of this waste of life, it may be repeated with advantage, that during the ten years between the last two censuses, thirty large towns, having a mean aggregate population of two and one-half millions, lost *every year* 32,735 persons more than would have died had they been subject only to the rate of mortality prevailing in the healthy districts.

The English Reports, through a series of now just forty years, teem with facts, with statistics which give them the test of accuracy; with contrasts between country and city, and between cities that have adopted or neglected the most approved sanitary measures that are as demonstrative as inductive reasoning can be, that the health and life of the population is to no small degree a determinable quantity. Upon it turns the welfare and progress of localities, and of the State not less than that of individuals. The statistics of American States, so far as reliable, show similar facts. It is through the light derived from these and from recognized causes of insalubrity and from corresponding efforts at removal of causes, that we are to hope for that appreciation of public health, which will diminish one of the greatest burdens of society, and so add to the happiness and prosperity of the citizens. Our healthiest country districts show an average lower than that of England, while some of our cities outvie them in prolific sources of disease.

MIASMATIC DISEASES.

Reports that reach us from various localities, and which are fully confirmed by the medical transactions of various societies, make it evident that the miasm which causes chills and fever, intermittent and remittent fevers, dysentery and certain forms of neuralgic affection, is prevalent in many portions of the State. While the word "malaria" is often loosely used and made the name for some unclassified ailments in which the identification is not accurate, it can not but be recognized that a sickness excited by causes without the human body and having periodicity as a prominent diagnostic symptom, is wide-spread in its prevalence, and is a severe tax upon the industry, labor and health of our people.

While some points as to this "influence" are obscure, there are some ascertained and guiding facts which have obtained the

ıeral consent of practitioners of medicine and studious ɜervers.

ʃts origin is exterior to man.

ʃt is chiefly, if not entirely, communicated to the human sys-
ı through the atmosphere, by means of the inbreathed air.

ʃhe air becomes supplied with this particular miasm chiefly
a result of conditions which interrupt or complicate the natu-
processes of vegetable decay and provide no means by which
products of such "metamorphosis" or disintegration can be
ɔidly enough appropriated by plants or in some other safe way
posed of or kept dormant.

As heat and moisture are essential to these decomposing
ınges by which the super-abundant and unappropriated
ganic matter, in the absence of natural or proper artificial
ɜasures, becomes a source of disease, it is especially during or
ɔn after continued heat, or during moisture and heat, that this
rticular miasm is produced. This fact is not disproven by
e other fact that periodical fevers often occur soon after a
vere drought. By it organic matter deep down and long
ıried, with its own sufficient moisture is reached by the heat
ıd so stirred into activity. Or a heavy rain after long heat and
ɔught, especially if followed by close or moist warmth, is apt
excite rapid fermentive action in it and in other unused
ɜgetation.

Such miasm is not carried, as a rule, to very great distances
om the locality of such decay, and therefore the origin is
ɜnerally to be sought in the region in which the effect is
anifest. It is true that we can not control certain conditions
atmosphere, of moisture or temperature, which especially
vor the production of the miasm or its characteristic effects
ı individuals at particular seasons. But by controlling any
ıe or more of the co-operating conditions which produce it, and
hich are essential to its manufacture, we prevent its production.
his is chiefly to be accomplished by effective drainage, and by
ı interruption or compensatory interference with these forced
ıd accumulated conditions of decay with which the occurrence
periodic fevers is associated. The value of this does not de-
ɜnd upon the assertion that the origin is purely vegetable, for
ɜcay of organic matter in any form whether in the mineral,
ıimal or vegetable outside of man can only be properly provided

for where there is no stagnant water. The following recent utterance of Russell illustrates it:

"It has been conclusively proved by experiment that the cleans ng power of soil depends on its porosity rather than its chemical composition; in other words, upon the proportion of air it contains. Hence a wet soil possesses but feeble oxidizing power, and the first steps towards the restoration of this power is to remove the water by drainage and allow it to be replaced with atmospheric air. The best illustration of the relative activity of air, earth and water, as decomposing agents, as well as of the conditions most favorable to the speedy completion of the process by each of those agents, is afforded by their action upon dead bodies. The organism to be destroyed is visible, but these microscopic particles of organized matter which constitute the most dangerous portions of our excreta are destroyed in those media under exactly the same laws. A carcass laid in the open air upon a hill-side is swept by the free air, whose activities are also stimulated by the sun's rays, and the tissues which clothe the skeleton soon disappear. If laid in a shallow, running stream, or moored near the surface of a deep river, the same result follows; and if buried in a porous, dry soil, after a time nothing but the bones and the denser parts, such as hairs, nails, or claws, &c., can be discovered. Under all these conditions there is more or less rapid renewal of the active agent. But if we enclose the carcass in a bog, or plunge it in stagnant water, or bury it in soil which is saturated with water, instead of a clean and harmless skeleton, we get a repulsive mass of putridity and offensive complex organic gases which impregnate air, water and soil."

Both Price and Milne, in the commercial interests of life insurance, long ago demonstrated the high mortality of towns and of marsh lands.

Many of the English Reports exhibit the insalubrity of undrained lands by comparing several country districts of similar area and habitation, but differing in this one regard.

Eight districts thus compared showed a mortality of 2.45 as against 1.80 and 1.40 in the drier districts. This is the more significant, as this class of disease entails an amount of ill-health and repeated suspension from labor quite in excess of the usual rating afforded by the percentage of mortality. In 1859, speak-

ing of another district, the report says: Wisbeach, once so unhealthy, lost only one hundred and thirty-seven persons by death against three hundred and sixty-seven in Northampton, out of a population exceeding it, being thirty-six thousand one hundred and twenty-five. The successful result of the drainage of the district will, it may be hoped, lead the proprietors of the low, ill-drained parts of the basin of the Thames and of our other rivers to imitate the spirited conduct of the proprietors of the valley." "Such facts justify the remark that ague and rheumatism are not now frequently fatal in this country, but they occasion an incalculable amount of suffering, disability and secondary disease, which will disappear when the soil is effectively drained."

Ely, in one of the old Fen Islands, was so wet that its Bishop, without a river, went in his boat now and then to Cambridge. In 1851 it started its noted sanitary plans. In 1876 we have this record:

"The great land drainage works have had great influence in improving the health of the Isle of Ely. By this means the atmosphere has been purified and dried, and the returns for Wisbeach, in a comparison of twenty years, shows a marked diminution of consumption in the last ten years. Similar facts are recorded as to Orsett and Salisbury and Sheppy. (XIX 1874.)

The relief which time and again has come to armies and to persons by change of locality, shows the localized character of the malarial miasm. Again the oft-recorded results secured by efficient drainage and regulations as to the disposal of vegetable accumulations, have fully shown that it is in the power of every such State as ours to remove or largely diminish this source of ill-health.

Such diminution is feasible not only as adding to health, and so to the productive capital of individuals, but also as permanently adding to the value of land, and so promoting the interests of agriculture and of all arts identified therewith.

So far as drainage is concerned, no State of the Union has a more satisfactory basis for procedure. The geological structure is well defined, the natural water courses or the indications and methods for artificial ones are determined. There is only need of an apprehension of the necessity and a promotion of the work by such schemes as have already been approved by our Legisla-

ture, and as only call for the co-operative action of a majority of the citizens of any particular locality.

The time is well nigh past when any particular district can conceal the prevalence of so well-known an enemy. A study of the vital statistics of the present year furnishes some facts in evidence. It is the part of such communities or districts first to inform themselves of the actual number of cases that have occurred in their particular districts, to note the special lines of exposure, and then to adopt such measures as are sure to abate the nuisance.

It may often occur that by reason of prevailing winds one side of a sluggish stream or of a marsh furnishes more cases than the opposite one, or that one house is shielded by trees while in another the exposure is increased by the direction given to currents or by the moisture they add to a soil already saturated. But in general, so soon as a close study of a locality is resolved upon, there are not wanting facts and evidence which serve to satisfy the majority of those who are seeking for the truth.

In a former report we have adverted to what has already been done at the Great Meadows, by which over five thousand acres of land in Warren county have been successfully drained. There is a tract of eleven thousand acres on the Passaic river in need of just such relief. The State Geologist has well said, "It is greatly to be desired that this drainage should be done. It would bring a large area of excellent land into profitable use, and thus increase the wealth of the State. It would be a public benefit in removing a fruitful source of disease."

Not less do our people suffer in health from smaller swamp areas. Large swamp tracts serve to keep off population, and so many are not subjected to them. Besides, when wholly uninvaded, they are not sources of miasm to the degree that are the smaller areas which are pressed upon by civilization. Nature in these larger swamps, has yet some of her natural water courses, and the laws of vegetable decay, so efficient when left alone, are not so largely disturbed as near populous places. It is when towns and villages and cities crowd upon, or are in close proximity to undrained lands; when natural water courses are obstructed and usual vegetable decay interrupted or greatly supplemented by artificial conditions, when factories, and roads, and embankments, and excavations disturb competent natural condi-

tions and substitute artificial ones; when soil and locality, which would naturally rid itself of undue moisture, is covered with buildings and strewn with products of decay without growth, to utilize these, that imperfect drainage, suspended evaporation and unappropriated decay together enforce the penalties which always attend such flagrant breaches of law. On the lines where town and country meet, where art intercepts nature and breaks her laws, what wonder that there should be shaking, and that both city and country send up into the inbreathed air vapors prejudicial to health? What wonder that with such products of animals as are added in crowded places, and with all the offal of house and city life, we have diseases so mongrel as scarcely to define their type? Malaria has typhoid appended to it, and a whole group of diseases spring into existence, for which the highest authority of the age can find no name so appropriate as that of "filth diseases." Until in city and in country we learn that there is economy, health and necessity in avoiding stagnant water, befouled air and stagnant filth, or in providing for their abatement wherever they exist amid the homes of human kind, we shall have to pay to invalidity, disease and death, and to all the crippled forces of life, a folly and poll tax for city, county and State, heavier than war or politics can levy.

Problems, which arise out of civilization and its crowded or artistic accompaniments, must be met by adequate counter-provisions or else race-disease, race-degeneracy and death are the penalties.

These considerations are of importance, not only because of the medical testimony of previous years, as to the prevalence of periodic fevers, but the evidence gathered from our own correspondence and from the transactions of medical societies is still more decisive this year.

No one class of diseases has been so prevalent the past year as that in which the element of periodicity as generally characterized by the terms "miasmatic" or "malarial" has been either the causal or the largely complicating factor. Nor can this be alleged to be a general atmospheric condition, as when an influenza or an epizootic passes over the land. The increase is, in many instances, traceable to changed local conditions arising from disturbance of soil, additional sources of decay, stoppage of natural water courses, or other changes incident to new occupa-

tion of land and increase of population. Where these have occurred alike at different localities, and some are affected and some not, it is often because the character of soil and geological structures beneath determine how far nature is capable of ridding itself of these unfriendly conditions.

As an illustration of this miasmatic tendency, we may quote from the reports of District Medical Societies, as contained in the last "Transactions of the New Jersey State Medical Society."

In Bergen county it is said "Malarial fevers have prevailed as extensively as heretofore, and with a decided remittent form, with hepatic, intestinal and splenic complications."

The Essex county report begins by saying: "For the past year, as for several years, malarial diseases have made an important element in practice."

In Hudson county the record is that intermittent and remittent fevers were prevalent a part of the year. The Mercer county report says: "In Trenton we have a large increase in malarial fevers. Intermittent neuralgia has been quite prevalent; indeed all diseases to a more or less extent have shown a tendency to periodicity." In Morris county there was "a marked increase in the number and severity of malarial disorders." In Passaic county "intermittent and remittent fevers have been more than ordinarily prevalent during the year." The same record is made as to parts of Somerset county. In Sussex county "intermittent and remittent fevers, and neuralgia of malarial origin seemed to have prevailed to an unusual extent in every locality heard from." Intermittent and remittent neuralgia are reported from parts of Union county. Warren county, at Washington, Oxford, etc., notices the great prevalence of periodic fevers. Although this report relates in part to the summer and fall of 1878, our own inquiries in 1879 show the same tendencies and occurrences continued. In Middlesex county there has been an increase, and reports from special localities in other counties show no diminution. The counties in the northern and western portions of the State seem to have suffered most, although the banks of the Delaware are never exempt. Towns and cities suffer much, while in the large and more rapidly growing of these there are mixed symptoms in disease which, by their mongrel character, show the trace of a distinct periodic type, and yet so commingled as almost to

stitute new forms of infection. This is especially noticeable ere city and country meet, and marsh lands press closely upon suburbs. It is not the abstract question whether a uriant marsh will care for itself, or whether the salt in undisturbed salt-grass meadow will aid in guarding deposition, but rather whether, after interrupting natural inage and natural vegetation, we can send out from a city own decaying vegetation and animal compost and sewage l make of the whole, broth and gases conducive to health. must guard the border land or else it will be a point of ack and not a defense. This entire subject of drainage and ter-delivery in the interests of public health demands far re attention from our citizens than it has yet received.

The only other disease which has prevailed in our State since last report, and yet does not make its record by name in the ssification of vital statistics, is influenza. Several counties l cities of the State report it to have occurred in an epidemic epizootic form. Its effects are only severe on older persons, h whom by reason of bronchial affections it sometimes proves l. It is quite probable that under the more general name of nchitis it has added to the large list of acute lung diseases. areful review of the report on vital statistics shows, as never ore, the actual causes of death, and enables us to compare alities in every township and city of the State.

As a part of the report of this Board to your Excellency, the eral papers herewith submitted will, we believe, be found of erest to yourself, to the honorable members of the Legislature, l of profit to all citizens of the State. In the securement these very great care of selection is exercised, and in general principles and methods advocated are such as command our roval.

THE PAPER ON HOUSE DRAINAGE AND SEWERAGE

lesigned to draw attention to the best methods of connection h mains, so that the house itself, with its inmates, shall be ired against the intrusion of deadly gases. The experience a practical sanitary engineer, as also of a practical plumber, y iven, and such directions as must greatly aid in the compr ore sion and application of methods. A clear statement of

objects sought and of methods proposed will enable all to adopt these views or suggest any others which can stand the test of actual observation and experience.

THE PAPER ON ASPHYXIA, WITH SPECIAL REFERENCE TO THE RESUSCITATION OF DROWNED PERSONS

Has been carefully prepared, after close investigation and experiments on the part of the author and with the aid of all the literature on the subject. The same principles of management apply in most cases of asphyxia, while our long line of seashore and our river communications point to dangers and accidents not infrequent. Our estimate of the importance of the subject is much increased since we find, by our vital statistic returns, that from July 1, 1878, to July 1, 1879, one hundred and ninety-three (193) persons in this State perished by drowning. In the light of recent investigations and disputations as to methods, a review of the whole subject was needed. To it some members of the Board have directed careful attention. We think that this paper will be found worthy of careful study. There is need of more provision along our coast line, for the safety of bathers or of those capsized in small boats. We commend the subject to the attention of all those who seek recreation by water.

THE ADULTERATION OF FOODS

Is so weighty a public concern that there is need that it be carefully watched under the oversight of experts. Public analysts at moderate expense are greatly needed. While the paper offered seeks to counteract a recent tendency to overstate adulterations, it recognizes the importance of constant inquiry. It is likely that a more extended examination of specimens would reveal new facts, and it is the desire of the Board that the public health be thus guarded. There are many other articles of which examination should be had, while the author desires a more extended series of tests as to some of those already examined.

No new examinations of kerosene have been conducted, but ur accident list records several cases of fatal burns therefrom. here is pressing need of some legislation which shall protect our eople from unrefined oils or from mixtures containing more aphtha and other ingredients than petroleum oil.

DISINFECTION AND DISINFECTANTS.

It has been the aim in the paper on disinfection, to select the uthenticated materials for use, to the exclusion of most of those nnecessarily protected by patents. The range here afforded is ufficient for all known indications, and directions are given so lainly as to be available to all. While these can not take the lace of cleanliness they often greatly aid in securing it while isease exists. It can not be too much insisted upon that it is he duty of each householder to see to it that causes of foul air re removed, and that the air itself is so dealt with as to remove rom it noxious ingredients. The circular is reprinted for ready eference.

METEOROLOGY.

The importance of the study of meteorology in its relations to isease is recognized. Yet there are many difficulties that mbarrass us. This article commends it to the careful inquiry f physicians, and presents suggestions as to some special points. t is only by long and close observation and the tabulation of acts that progress can be made. The close observation of ndividuals is magnified as to be considered along side the ecords of instruments of precision.

GOVERNMENT OF FORCES.

The letter presented to the State Commission on the government of towns is reproduced because it presents some of those reasons which commend the subject to the towns themselves. There is a spirit of inquiry in this direction, and our cities may profitably study the problems which ere long will force a more public and official consideration.

UNDERTAKERS AS RELATED TO PUBLIC HEALTH.

The Board has had occasion for considerable correspondenc with undertakers. Their work is regarded as so special that i some of our States a license is required. The more intelligei of this useful class of citizens have come to feel the importan of accurate death returns, and have responded to the requir ments of the present law. In country districts some do n promptly enough return the certificates to assessors, and tl Board is about to institute more rigid methods of inquiry. is evident that the undertaker in his contact with famili during the prevalence of sickness or after death is capable aiding much by sanitary advice, and no class need to be mo accurately informed. Also there are great errors that occur the sanitary conduct of burials, which can only be correct when our undertakers are intelligent as to the sanitary requisit of their calling. It is more than a mere art of adornment act of burial. It should include all that knowledge whi secures a due preservation of the dead for a limited time, a which best protects the living from the evils of foul air or tl infection of contagious diseases. Often more depends upon tl undertaker than upon all the other attendants or assistants co bined. It is now possible to practice this calling as an art, a to do much to protect from the extension of disease. We dire their attention to this article and to that on disinfectants, as ir parting knoweledge with which they need to be familiar, and f which they will find frequent use.

The meteorological notes for the year are not as perfect as v had hoped. By reason of the sickness of observers, there ha been some interruptions.

Instruments are now placed at desirable points, and observe secured so that we shall hereafter, it is hoped, present tl readings with accuracy. This is a department of observ tion in which we accomplish something by adding to tl general stock of climatological information, but need to be slo in drawing or accepting conclusions.

As the domain of sanitary legislation and the powers to l conferred on Health Boards, need to be better understood, v are glad to secure a report upon this subject from an able me

er of the New Jersey bar. We invite to it the careful attention f our law-makers, and of all who recognize the need of some nactments and decisions, to prevent the litigation and delays rhich now so often embarrass local authorities and permit ıuisances to imperil the general health.

The report of the Medical Superintendent of Vital Statistics ommences with July 1st, 1878, and extends to July 1st, 1879. It is the first attempt in this State to make a tabular study of the causes of disease. While some valuable facts are already indicated, yet it is chiefly by comparing five or more years, that we get at the precise death and sickness rates of localities. The report, with the tables accompanying, is commended to the careful study of physicians, and of all who recognize the significance of such facts as to the population. Although, by law, this report is made a part of the annual Health Reports, the service is a bureau of the State Department, and under the Secretary of State. To him the Medical Superintendent is greatly indebted for his official co-operation and for valuable suggestions, as well as to the Board of Health, which recognizes these studies as a virtual and essential basis to sanitary science, and its application in practice. The experiences of the past year fully certify the practicability of the general methods adopted, while such improvements will be made as practice and study may indicate.

HOUSE-DRAINAGE AND SEWERAGE.

BY EZRA A. OSBORN, C. E.

The introduction of water into houses and the system of rainage necessary to carry off waste, all of which comes under he head of plumbing, has become a matter of importance, inasnuch as great danger to life and health arises from gases geneated in the sewers and cesspools, which we feel safe in saying, n a majority of cases, find their way into dwellings in consequence of the careless and unscientific manner in which this kind of work is done. This is, perhaps, not to be wondered at, when it is considered that in most cases this matter is entrusted o the mechanic who offers to do it for the least amount of money. The builder fails to appreciate the danger to which the occupant of the house, when finished, will be subjected, in consequence of the unskillful arrangements of pipes, traps, &c. Ignorance in a matter, the result of which is so frequently fatal to life, may justly be termed criminal. In order to arrive at a better appreciation of this important branch of mechanics, we desire to explain, in a simple manner, our views as to what is essential to safety in all cases where house drains are connected with sewers. First essential: "Every vertical soil or waste-pipe should be extended at least full size through the roof. No traps should be placed at the foot of vertical soil-pipes to impede circulation. Traps should be placed under all sinks, basins, baths, wash-trays, water-closets, &c., and as near to these fixtures as practicable. All traps under fixtures, whenever practicable, should be separately ventilated, in order to guard against syphonage. Such vent-pipes should not branch into a soil-pipe below where any drainage enters it. In some cases it is preferable to carry it to the outer air independently. Rain-water leaders should not be used as soil-pipes, and when connected with house drains they should be made of cast iron in preference to galvanized sheet iron or tin, there being less liability of corrosion. Joints should

be gas and water-tight, to preclude possibility of drain air entering open windows. No safe-waste should connect with any drain, but it should be carried down independently to a point where the discharge would indicate the existence of a leak or any overflow above. No waste from a refrigerator should be connected with a drain. Unless the water supply is ample, so that it will rise to every part of the building, insuring at all times the proper flushing of fixtures and traps, a cistern should be provided, into which the water will rise at night, or into which it may be pumped. Said cistern should be large enough to hold an ample daily supply, and be kept clean, covered and properly ventilated. The overflow-pipe from it should never be run into any drain under any circumstances. The supply for drinking water should not be drawn from it, but from a direct supply, *i. e.*, direct from the street main.

Water-closets should not be supplied direct from street pressure or by a pipe from which branches are taken for drinking water. Where the water-closets are preferred to those that are supplied from a small cistern immediately over them, then the supply should be taken to a storage-tank, from which it can be conveyed to the valves on the closets, thereby insuring an equable pressure and securing more reliability in their working.

All drain-pipes within a house should be of metal in preference to stoneware, owing to the liability of the latter to crack, and the difficulty of keeping the joints tight. It is best to run them along the cellar wall or ceiling with a good incline. They should never be hidden under ground, as there leaks will not be perceptible. In some places it is common to paint pipes white, so that any leakage will show itself to the most careless observer. All drains should be kept at all times free from deposit; and if this cannot be effected without flushing, special flushing arrangements should be provided, so as to effectually remove all foul matter from the house-drains to the public sewers. All drains should be laid in a straight line, with proper falls, and should be carefully jointed and made water-tight. No right-angled junction should be allowed.

A drain passing under a dwelling house should be constructed of cast-iron pipes with lead caulked joints, laid so as to be readily accessible for inspection. Whenever dampness of site exists it should be remedied by laying sub-soil drains, which

hould not pass directly to the sewer, but should have a suitable reak or disconnection. Water supply and drain-pipes should e concentrated as much as possible, and not scattered about a uilding. Horizontal pipes are objectionable.

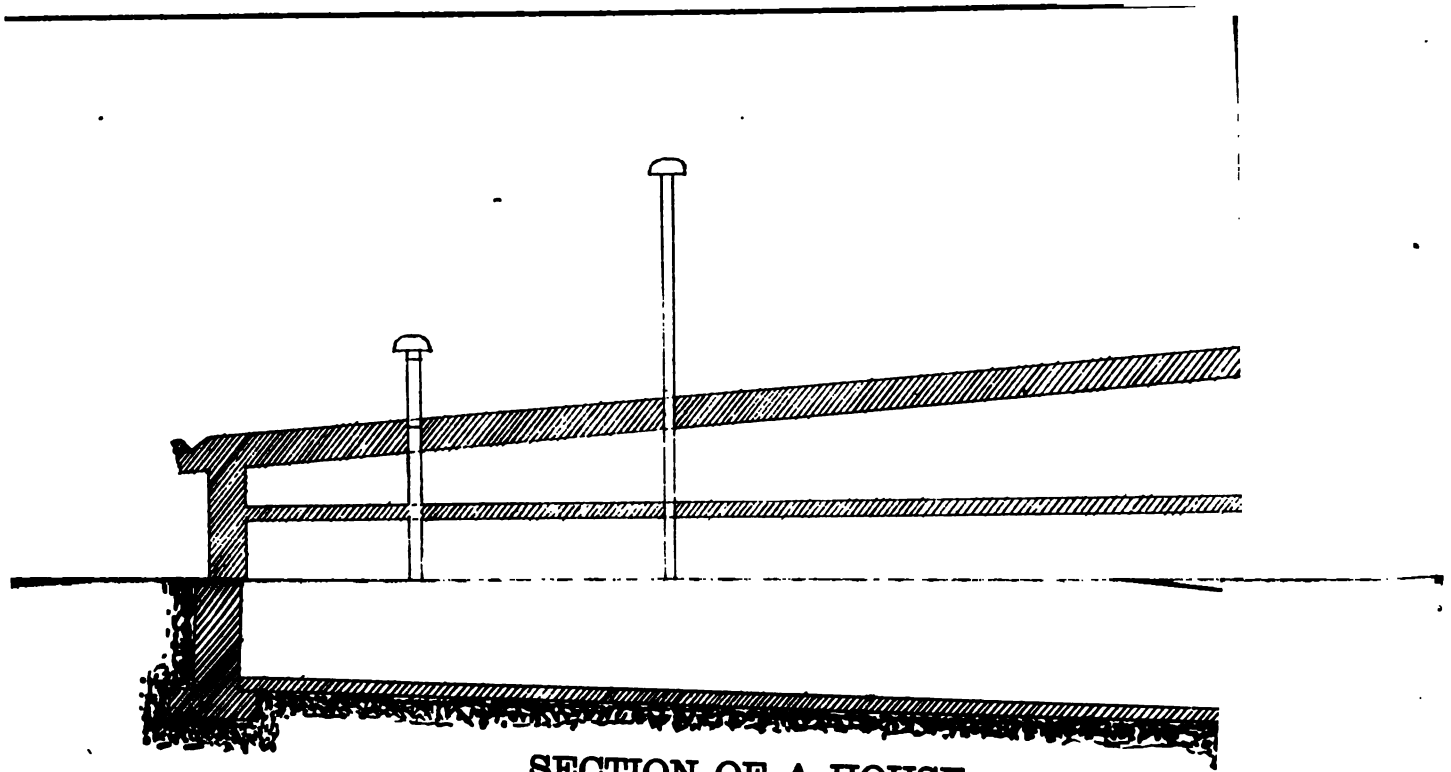
Plumbing fixtures should not be hidden behind walls and artitions where their condition is never apparent. They ought o be made easily accessible and so situated that any leak will be eadily detected." In no case should lead waste-pipe be connected to iron pipe with cement or putty. Connection can be made by the use of a brass ferrule or thimble, one end of which should be caulked into the iron the other soldered to the lead, or a good and more economical plan is to turn the end of the waste-pipe over a ring of some metal and caulk into the iron pipe. Without claiming to have exhausted this subject we have endeavored, and hope we have succeeded in our endeavors, to make easily understood the fundamental principles which should be observed in the arrangement of soil, waste and ventilating pipes, in order to secure immunity from danger by reason of allowing the poisonous emanations from sewers to pass freely into dwellings. Next in importance we remark that care should be exercised in the selection of plumbing materials as regards quality, especially water-closets and traps. The former should e so constructed as to positively prevent the back-flow of foul ir or sewer gas; and the traps of such kind and shape as will e least likely to be emptied by suction or syphonage. In ct all modern fixtures and appliances for the convenience nd comfort of our homes should be thoroughly understood ractically and scientifically, and so constructed that it hall be impossible for any evil to arise from sewer-drains, ater-closets, basins, traps, &c. So many contrivances are based pon this one idea, it surely seems that all of them should nswer the purpose of pure sanitation. Diseases caused by foul ir that can be prevented, requires one very essential condition, . e. cleanliness, and to become clean, all filthy matter must be ared for without offense. Now the question is, how can this be ccomplished effectually and economically? The different nventors of sanitary appliances have as many modes as there re inventors. For the purpose of bringing such articles and appliances before the public, the New Jersey State Board of Health proposed to make a public exhibit of appliances for per-

fecting house drainage. Upon conferring with the New Jc State Agricultural Society, (it being partly supported by State), it was arranged to have an exhibition of sanitary a ances in full operation at the Annual Fair at Waverly. In tors and dealers in sanitary appliances to some extent, respo to our circulars, and so made the exhibit a good beginning t important yearly display. The Board of Health not having funds to erect the proper buildings, water supply, &c., nece to show water, sewer and plumbing arrangements, by solicit of said Board, E. Dunn & Bro., practical plumbers and san engineers of Newark, N. J., undertook, at considerable exp to themselves to provide for this part of the exhibit. With diligence they prepared some specimen plumbing, as well complete system of house drainage, with drain and trap v lation. It was put in full operation, in such a position every part could be seen, the water being supplied to a tan a Rider atmospheric pumping engine. The whole san exhibit was very carefully and critically examined by a mittee of ten experts, comprising professors, physicians, engineers, &c. For the purpose of assisting the public to prehend how house-drainage should be done, we present system and plans as thus shown:

[SEE DIAGRAM.]

The diagram of this exhibit is presented herewith, shows a trap is placed outside of the house (which should be in a v of easy access for the purpose of cleaning), and close to this next to the house, a ventilating-pipe carried above the The soil-pipe is carried full size through the roof.

In connection with each line of waste and soil-pipe there circulating air or main vent-pipe running independently t roof, and above the soil-pipe, the main vent. A branch is nected from each trap on that line, thus maintaining an circulation, it being impossible to syphon the traps. To u stand the practical working of currents of air through pipes, the committee had them bored, which, by the applic of a lighted match, fully demonstrated the direction and fo the air currents.



SECTION OF A HOUSE,

SHOWING

[illegible]

t is to be hoped that from year to year various plans of house inage, sewerage and ventilation will be thus exhibited.

The exhibit was visited by a large number of persons in and of the State, who manifested a great interest, and were greatly ased to have the chance to investigate a system in practical ration. The matter of house drainage and ventilation is not ended to be confined to dwellings or houses we live in, but re- es to all places where people congregate or are employed, ether churches, work-shops, schools, stores, depots, cars, &c., &c. loes seem, that with the many plans of reducing foul air and npletely deodorizing all kinds of filth that any person of linary intelligence should live in a clean and decent manner hout any legal compulsion. In our suburban houses and ntry places there does not seem to be any excuse for evil cts from house sewerage, privies, &c., where dry earth and es are always at hand. The writer when building his house 1852 arranged in a rude way for using marl, with a very little uble, for privy and other filth, thereby keeping down all the rs, &c. The plan works well at a nominal cost; in fact the npost made as a fertilizer more than pays for the trouble. t many say that while their neighbors have all kinds of aying matter about their premises there is little use of their ing much with the nuisance just along side. We have had ny such complaints, some of which have been published. It ms as if our State must take notice of such evils and by islation have the same abated, and our Legislature make h laws as will conduce to the public good by summary state- nt of filth nuisances. The sanitary care of premises is best d in a single suggestion of J. C. Bayles, author of "House ainage and Water Service:" "The first essential condition of althfulness is cleanliness. The shovel, the broom, soap and ter, sunshine and ventilation are the agents upon which we ust mainly rely in guarding against unhealthful conditions in r surroundings. How, when and where the broom, shovel d scrubbing brush need to be employed the reader must cide for himself. I can only say in a general way that any- ing and everything which can be properly classed as "dirt" ould be put where it belongs. It will then cease to be dirt. ere are few things so dangerous that we cannot rob them of ir power for mischief by putting them in their proper places."

A very practical country physician was once asked by a neighbor, who was not over-particular as to the condition of his premises, what would be the best disinfectant to get for use before hot weather came on.

"I will give you a prescription if you will get it filled and use it," said the doctor.

This was agreed to, and the doctor wrote as follows:

℞ Rake..... 1
Shovel..... 1
Wheelbarrow..... 1

Sig.—Use vigorously every twenty-four hours, until relieved.

The hint was taken and the premises were cleared up. Air and sunshine did the rest.

ASPHYXIA.

SPECIAL REFERENCE TO THE TREATMENT OF THE DROWNED.

BY T. G. CHATTLE, M. D., OF LONG BRANCH.

economy of the animal system provides that the blood
e ærated or supplied with oxygen, by the absorption of
n air into the lungs. To this end these organs are com-
f a net-work of minute cells, or air vesicles, into which,
ıing else other than common air is introduced, it becomes
n body, and as such, needs to be immediately rejected;
common air is merely excluded, they cease to perform
ıtural functions.

result of the æration of the blood, is the evolving of
l heat, and that action of the vital fluid, upon which
s the healthy action of the brain, as well as the systematic
tion of the ventricles of the heart, and the origination of
rvous fluid, or influence, through which the motions and
ons of life are derived. Whatever interferes with this
ıpply, destroys the normal action of the whole vascular
that is dependent upon it, and life itself is soon extin-
l.

inspiration or breathing in of oxygenized air, and the
ion or breathing out, of carbonized air is known as respi-
and is performed directly through the lungs, under the
ıical action of other organs. The most prominent of these
diaphragm, which, being situated midway between the
es of the animal system, aided by the muscles of the
nd abdomen, conducts any expulsive effort that the
may be called upon to make. Its importance in the
ıism of breathing is such, that should it become inactive,
lyzed, a speedy death would result to the individual from the
breathing power. This organ, whether active or inactive
sensitive to the external influences, and is readily stimu-
quieted, by external force or injury. It also, in turn,

is under the control of the inter-respiratory, or phrenic nerve, whose branches are distributed over its whole under-surface. When the nerve-force ceases to be exerted, the diaphragm ceases to act, and the respiratory movements of the chest are quiet, but as soon as this is stimulated by mental influence, or mechanical causes, the expansion and contraction of the chest ensues, and respiration is performed.

The substances and organs thus concerned in sustaining life, are the lungs, as the receptacles for air and blood, the air supplying the elements of blood purification, the blood producing nerve-force, the phrenic nerve originating action in the diaphragm and its attendant muscles, and the diaphragm itself, which is the lever that raises or depresses the chest in its bellows-like movements during respiration. Whatever prevents the healthy action of the blood or the action of the diaphragm, causes a cessation of the forces sustaining life, whether it be physical injury, the breathing of poisonous gases, impeded respiration or the non-elimination of carbonic acid gas.

In the functions of the heart and lungs, there may be a real or apparent cessation, while the apparent by a prolongation, may become real. The apparent cessation is asphyxia; the real, is death. Asphyxia in its technical sense, signifies a want of pulsation, but in its common acceptation is used to indicate a condition of suspended animation, whenever this suspension occurs from a retarded respiration. There may be apparent suspension of the heart's action, without entire suspension of respiration, as in syncope, and there may be apparent suspension of respiration without entire suspension of the heart's action, as in apnœa, and there may be apparent suspension of both functions, as in catalepsy. But when a real suspension takes place in the functions of respiration, it must soon be followed by a similar suspension of the heart's action or vibrations, indicating death. The same forces that prevent the normal action of the respiratory nerves and muscles, as smothering, drowning, strangulation, carbonic acid, and other poisonous gases, are all causes of asphyxia, either mechanically or otherwise impeding the acts of respiration, and place the patient in a condition that without relief must end in death.

Where different organs are successively affected, in close connection with each other, by disease or accident, it is difficult to

ive the exact order of the phenomena as they occur, but the xperience and observations of those who have examined the natter closely, would seem to indicate the following as the order f the arrest of the vital functions in asphyxia. Any obstruc-on to the entrance of air into the lungs, renders the flow of lood slower in the whole vascular system. It gradually be-omes filled with carbonic acid gas, which so thickens it, that it annot circulate through the capillaries. The brain is only sup-lied then through the larger vessels, and being sluggish from he want of oxygen, it enfeebles the action of the cerebrum, lestroying its influence over the nerves both of motion and ensation, which involves the cessation of the action of the phrenic nerve, and its attendant muscle the diaphragm. Capil-lary congestion ensues as the respiratory action is weakened, which demands increased labor on the part of the heart, while from the want of purification of the blood the labor becomes more and more difficult, until exhausted from the loss of nerve force, its contractions cease entirely and life becomes extinct.

It has been generally believed that the contractions of the heart ceased soon after the close of respiration, and authorities have been experimenting for years with a view of arriving at some definite knowledge concerning this matter. While the result of their investigations has brought them to different specific conclusions they have still indicated one general average. Experiments have been made on pups, rats, rabbits, cats and other animals, where they have been submerged, or placed in carbonic acid gas for various lengths of time, and have been examined at different periods after life had been apparently ex-tinct, varying from two minutes to an hour, and various results have been found. In experimenting on twenty different animals, in two cats it was found after a complete submersion of one for ten minutes, and between five and six minutes after asphyxia had thoroughly taken place, in the other after a complete sub-nersion of eight minutes, and an examination in four minutes after complete asphyxia, that the ventricles were in active con-raction, with a convulsive tremor of the respiratory muscles, as f a slight respiration were taking place or endeavoring to re-stablish itself. The shortest time in which all heart action was noticed to have ceased was in a pup, where in two minutes and en seconds there was not a sign of life to be discovered. In the

remaining seventeen, the time varied from two and a half minutes to three and a half and four minutes, making the average duration of the contractile power of the heart about eight minutes after submersion, and about three minutes after complete asphyxia.

As it is sometimes the case that bodies are taken from the water after the lapse of a considerable time, and efforts are made at restoration, it becomes a matter of some importance to know how long a body may remain under water and be revived, or at what precise point the vital functions are so far destroyed as to make it impossible to call them again into active duty. Although the length of time during which action of the heart continues after asphyxia, has been well determined by experiment, as also the time that a body can be drowned and yet revived, has been well determined by observation, so that there would seem to be but little variation, yet circumstances do exert great control in cases of this character. Three minutes is the established rule, after which there can be no recovery, if it be real drowning, but persons have been recovered who have remained under the water in an asphyxiated condition for four and five minutes. The last is the longest possible time after which resuscitation could take place, unless the case be one of syncope or nervous shock, when persons have been revived even after fifteen minutes apparent death. Those capable of inhaling and retaining a large amount of air into the lungs, and those who retain their presence of mind in the greatest degree are those who resist the dangers of submersion for the longest time, and are the most readily revived, while those who force nearly all the air from their lungs at the first shock, can seldom be recovered.

As the vast majority of asphyxiated cases are those of drowning, and as the specific treatment is nearly the same in cases of whatever character, it is deemed only necessary to turn the attention to the care and treatment of the drowned especially.

DROWNING.

In drowning, the organs that are primarily affected are those of respiration, those secondarily affected are those of circulation, and the phenomena that present themselves during the act of drowning are as follows:

When a person falls into the water or is exhausted by the act swimming, he goes beneath the water, then again comes to surface, aided by the buoyancy of the air in the body and in clothing. In coming to the surface, realizing danger, he tinctively assumes the upright position, springs from the sure, and throws up the arms for help, at the same time endeavng to relieve the desire for breath, by an inspiration, and to press the desire for aid, by calling out. This effort takes in ter as well as air, and produces a slight spasmodic cough dur- which act the body goes beneath the surface the second time. the consciousness of sinking becomes more acute, there is an onized expression of the countenance which is indescribable, t which, when once seen, will be ever remembered and recogzed—and at the same time frantic efforts are made to grasp erything that can be seen, whether within reach or not, and is desire continues even after having sunk, as oftentimes bodies e found clutching the weeds, grass, or stones, that may be und at the bottom of the water.

Sometimes the air is so exhausted from the system, that the body es not come to the surface after going down the second time, but nerally there is sufficient inflation to bring it once more to the rface, when as soon as the head comes above the water, the rgency to take breath has become so great that a full inspiraon is made without due caution, and a large quantity of water, d a small quantity of air is taken into the system. The water netrating into the bronchial tubes produces a second fit of ughing, expelling what little air may be left, and the body nks just below the surface or goes to the bottom.

Along the sea coast casualties of this character generally occur those who are expert swimmers—they becoming exhausted by o severe an effort in this direction.

However, it is not always the case that those who are said to e drowned are really so. Death in the water may arise from haustion, nervous shock, cerebral congestion, or apoplexy. In ses occurring from other causes than drowning the body selom sinks immediately, but floats upon the surface, and it is sirable to know when a body is taken from the water, whether e condition is one of asphyxia from submersion, a condition of ncope, or a condition of death from some other cause. It is eless to endeavor to resuscitate a body dead from nervous

remaining seventeen, the time varied from two and a half minutes to three and a half and four minutes, making the average duration of the contractile power of the heart about eight minutes after submersion, and about three minutes after complete asphyxia.

As it is sometimes the case that bodies are taken from the water after the lapse of a considerable time, and efforts are made at restoration, it becomes a matter of some importance to know how long a body may remain under water and be revived, or at what precise point the vital functions are so far destroyed as to make it impossible to call them again into active duty. Although the length of time during which action of the heart continues after asphyxia, has been well determined by experiment, as also the time that a body can be drowned and yet revived, has been well determined by observation, so that there would seem to be but little variation, yet circumstances do exert great control in cases of this character. Three minutes is the established rule, after which there can be no recovery, if it be real drowning, but persons have been recovered who have remained under the water in an asphyxiated condition for four and five minutes. The last is the longest possible time after which resuscitation could take place, unless the case be one of syncope or nervous shock, when persons have been revived even after fifteen minutes apparent death. Those capable of inhaling and retaining a large amount of air into the lungs, and those who retain their presence of mind in the greatest degree are those who resist the dangers of submersion for the longest time, and are the most readily revived, while those who force nearly all the air from their lungs at the first shock, can seldom be recovered.

As the vast majority of asphyxiated cases are those of drowning, and as the specific treatment is nearly the same in cases of whatever character, it is deemed only necessary to turn the attention to the care and treatment of the drowned especially.

DROWNING.

In drowning, the organs that are primarily affected are those of respiration, those secondarily affected are those of circulation, and the phenomena that present themselves during the act of drowning are as follows:

Vhen a person falls into the water or is exhausted by the act swimming, he goes beneath the water, then again comes to surface, aided by the buoyancy of the air in the body and in clothing. In coming to the surface, realizing danger, he inctively assumes the upright position, springs from the sur-e, and throws up the arms for help, at the same time endeav-ıg to relieve the desire for breath, by an inspiration, and to ress the desire for aid, by calling out. This effort takes in er as well as air, and produces a slight spasmodic cough dur- which act the body goes beneath the surface the second time. the consciousness of sinking becomes more acute, there is an nized expression of the countenance which is indescribable, which, when once seen, will be ever remembered and recog-ed—and at the same time frantic efforts are made to grasp rything that can be seen, whether within reach or not, and s desire continues even after having sunk, as oftentimes bodies found clutching the weeds, grass, or stones, that may be ınd at the bottom of the water.

Sometimes the air is so exhausted from the system, that the body es not come to the surface after going down the second time, but nerally there is sufficient inflation to bring it once more to the rface, when as soon as the head comes above the water, the gency to take breath has become so great that a full inspira-n is made without due caution, and a large quantity of water, d a small quantity of air is taken into the system. The water netrating into the bronchial tubes produces a second fit of ughing, expelling what little air may be left, and the body ıks just below the surface or goes to the bottom.

Along the sea coast casualties of this character generally occur those who are expert swimmers—they becoming exhausted by severe an effort in this direction.

However, it is not always the case that those who are said to drowned are really so. Death in the water may arise from haustion, nervous shock, cerebral congestion, or apoplexy. In ses occurring from other causes than drowning the body sel-m sinks immediately, but floats upon the surface, and it is sirable to know when a body is taken from the water, whether e condition is one of asphyxia from submersion, a condition of ıcope, or a condition of death from some other cause. It is less to endeavor to resuscitate a body dead from nervous

shock or apoplexy, while it would be criminal to allow one to perish that might have been resuscitated by proper means.

The face of a person drowned is of a dark livid color. The eyes protrude and the vessels of the neck stand out full and turgid. Froth or foam oozes from the mouth and nostrils, sometimes white, but generally rusty or streaked with blood. The tongue is swollen, and almost always marked by indentations from pressure against the teeth. Such are the prominent appearances within a few moments after drowning. The later appearances do not interest those whose desire it may be to restore the recently drowned.

For years it has been the study of scientists in physiology and hygiene to elaborate the most practical method of resuscitating drowned or asphyxiated persons, and to establish a code of rules best adapted for the purpose under all circumstances. Fortunately for the patients and for science, the old plan of suspending the patient by the feet and then rolling the body on a barrel, the object of which no one could divine, has become obsolete among well-read people, and more improved plans have been largely adopted.

The method, which has become the most prominent, because it was the first laid down in accordance with any fixed rule, is that generally known as "Hall's Ready Method," and was originated by Dr. Marshall Hall, of London, as follows:

1. Place the patient gently on the face for a moment to allow the escape of fluids from the mouth.

2. Turn the patient on his back and irritate the nostrils by snuff, a feather, ammonia, &c., and dash hot and cold water alternately upon him.

3. Place the patient on his face, with the wrist under the forehead, then turn the body gradually, but completely on the side and a little more, then back again on the face. When replaced on the face, apply pressure along the spine and ribs, then proceed as before, repeating these measures sixteen times in a minute only.

4. Rub all the limbs upwards, firmly but energetically.

5. Replace wet clothes by such other covering as can be procured.

A later method proposed by Dr. Sylvester, and a better one than the preceding, is as follows:

1. Clear the mouth and throat of dirt and saliva, and draw
e tongue forward by the thumb and finger or by a pair of
ceps.
2. Place the patient on his back with his shoulders slightly
sed.
3. Let the operator kneel behind the head of the patient and
sp the arms just above the elbows, drawing them gently and
adily upwards until they meet above the head; then bring
m down again to the sides of the chest, compressing it in a
ght degree, so as to imitate expiration. This is to be done
teen times in a minute.

That known as the "Howard Method," is as follows:

1. Turn the person on the face, with a bundle of clothes be-
ath the stomach, at the same time pressing on the spine to
ct the fluids.
2. Then place the patient on the back, with the bundle of
thes underneath, to elevate the pit of the stomach.
3. Let the operator kneel astride or beside the body, near the
ps, and with the ball of the thumbs resting on either side of
e pit of the stomach, let the fingers fall into the grooves be-
een the ribs, let the operator throw himself forward and
ueeze the waist, then let suddenly go. At first make four or
e movements of this character in a minute, and gradually
crease up to fifteen.

The method recommended by the Life Saving Association, of
ichigan, is embraced in the following:

1. Place the patient on his face.
2. Bestride the body, and grasp the clothing over the shoul-
rs; or if the body be naked, thrust your fingers into the arm-
s, clasping the thumbs over the shoulders.
3. Raise the chest as high as you can without lifting the head
m the ground, holding it until you can count one, two, three,
y slowly.
4. Then let the body rest on the ground, the forehead on the
ed arm, the neck straight and nose free.
5. Then place the elbows inside your knees, and with the
nds on the sides of the patient's chest, over the ribs, press
rnward and inward with increasing force long enough to
nt one, two. Suddenly let go the waist and clasp the shoul-

ders, as before, raising the chest. Repeat these movements ten or fifteen times a minute.

The directions laid down in the Regulations of the United States Life Saving Stations, are as follows:

1. To arouse the patient. Unless in danger of freezing, do not move the patient, but instantly expose the face to a current of air. Wipe dry the mouth and nostrils, rip the clothing so as to expose the chest and waist, then give two or three quick smarting slaps on the stomach and chest with the open hand.

2. To throw off the water. If the jaws are closed separate them and keep the mouth open by a cork or a bit of wood. Turn the patient on his face, having a large bundle of clothing tightly rolled, placed beneath his stomach. Then press heavily over it for a moment, or as long as the fluid keeps flowing from the mouth.

3. To produce breathing. Clear the mouth and throat of mucous by introducing the finger, covered with a handkerchief, into the throat; turn the patient on the back, the roll of clothing being placed under the back so as to raise the stomach above the level of the other parts of the body. If another person be present, let him hold the tip of the tongue out of the corner of the mouth, with a piece of dry cloth, while with the other hand, grasp forcibly both wrists, and keep the arms stretched back above the head, thereby increasing the prominence of the ribs, which tends to enlarge the chest. Kneel beside the patient's hips, and with the balls of the thumbs resting on either side of the pit of the stomach, let the fingers fall into the grooves of the short ribs so as to afford the best grasp of the waist. Using the knees as a pivot, throw all the weight forward on the hands and at the same time squeeze the waist between them as if you wished to force everything in the chest up out of the mouth. Deepen the pressure while slowly counting one, two, three, then suddenly let go with a final push, which brings you back to a kneeling position. Remain erect on the knees, while counting one, two, three, then repeat the same motion as before, gradually increased to fifteen times a minute, imitating the same regularity observable in the natural motions of breathing.

4. If natural breathing be not restored after a trial of the bellows movement for the space of four minutes, then without

errupting the artificial respiration, turn the patient on the mach a second time, and rolling the body in the opposite ection from that in which it was first turned for the purpose freeing the air passages of any remaining water, continue the ificial respiration as above.

5. Rub the limbs briskly, and upwardly, with a firm, grasping essure and energy. Warmth should also be promoted by plying hot flannels.

Dr. Satterthwaite, in the first number of the medical journal, *blic Health*, lays down a plan of treatment that is far more entific and sensible than the majority of the plans that so en appear in medical periodicals. His plan is as follows:

1. Try and get something warm to exchange for wet clothing. nd at once for hot water or have a fire built, into which bits of etal or stones may be thrown and heated, and from which you ay warm blankets and the bystander's clothes, which are to be plied in rapid succession.

2. Try and get rid of the water by slightly elevating the body hile the mouth is wedged open and the tongue depressed. To this effectively, roll the person on the face, raising the body, wer extremities and feet slightly, then wedge the mouth open ith a bit of wood or knot in a handkerchief, then place the left refinger on the back of the tongue and depress it. The finger ill not be bitten, because the mouth cannot close. This opens e windpipe better than if the tongue is drawn out. Then get- ng beside or astride of the person, press with the flat of the and upon the bowels, pushing them upwards at the same time. half a minute or less the water will be driven out sufficiently commence artificial respiration.

3. Turn the patient on the back, with the head still a little wer than the body, and make upward pressure on the bowels. ress the right hand upwards toward the spine until you hear e air passing out of the mouth. Commence first slowly, and aving driven the air out, remove the hand that the air may ter again. Then make upward pressure again, trying rather exhaust the air thoroughly than rapidly. Three or four otions will be sufficient at first, then gradually increasing to n or fifteen a minute, until there are evidences of life, or it is ain that it is extinct.

The writer, who, from a residence for a number of years near the sea-coast, has been called upon to manipulate with drowned bodies, has been compelled from the force of circumstances to devise a method that might be carried out irrespective of any help. In reasoning out a method, the deductions were made from the explanations given in the first part of this article.

1. That air is necessary to sustain life.

2. That certain organs are used for the reception and dissemination of air through the blood.

3. That certain organs are used for the introduction of air into the first-named organs.

4. That a certain systematic mechanical movement is necessary to set these organs in motion and keep them going.

5. That nature has adopted the easiest way of producing such movements.

6. That all substances should be removed that would impede such movements or the reception of air.

7. That natural warmth must be restored.

8. To use such agents as will effect the work speedily.

1. Cleanse the mouth, nostrils and face with a cloth or handkerchief, before the body is disturbed.

2. Tie a knot in a cloth or handkerchief, and draw it in the corner of the mouth between the teeth. This presses down the tongue, and keeps the mouth open, saving the necessity of an assistant to pull out the tongue.

3. Turn the body toward the right side, over on the face, with the head resting on the arm of the body, or anything else, to raise it three or four inches from the ground. By turning the body toward the right side, the gravity of the fluids in the stomach will force a certain amount through the pyloris, which is relaxed in asphyxia. After the body is turned on the face, clasp the arms around the body, interlacing the fingers just below the hollow of the breast bone, or over the pit of the stomach, then give several quick jerks with the interlaced fingers, upward, as if trying to jerk the breath out of the body. This produces the same movement that the stomach undergoes in vomiting, and will eject the contents of the stomach, also it will force from the trachea, froth, water, or other foreign substance that may have penetrated to the lungs. A few seconds will serve for this purpose.

4. To excite respiration, turn the body on the back; with one hand press heavily and suddenly on the pit of the stomach, while with the other hand just above it press the chest inward and downward, then release it quickly, then grasping the body around the waist, with the operator's arms under the patient's arm-pits, raise the patient forward gently and quickly to a sitting posture then lay it down again and press the pit of the stomach as before. The pressure upward creates an impulse toward the heart, as well as an expiration. In lifting the body, the weight of the abdominal viscera serves to draw the respiratory muscles down, which produces inspiration, while laying the body down, and, pressing upon it, pushes the diaphragm up, producing expiration.

5. As the body is grasped to raise it, the operator should slap the sides of the chest below the ribs, to excite action of the phrenic nerve. These motions should be repeated about twelve times a minute. As soon as breathing is established, remove the wet clothing, replacing it with that which is dry and warm, even if it be the operator's own coat. The above can all be accomplished by one person, and had better be done mostly by one, even if assistants are near.

When there are bystanders or assistants at hand, while the operator is going through the method of respiration, let some of the others strip the patient of wet clothing, keep the chest bared to the waist, get hot water and dash it upon the chest to produce shock. Let others rub the extremities and limbs briskly and upwardly, either with the hand or warm cloths or blankets.

If when a person is taken from the water the fingers are contracted or hands clasped, it may be considered an evidence of remaining vitality, and should stimulate to exertions until relaxation shows returning consciousness or the presence of death.

After persons have been recovered, they should be warmly covered and remain undisturbed, if possible; or, if necessary to remove them, let it be gently done, and give them a little coffee, with animal broths, to aid returning vitality, as there is danger of a secondary shock after apparent recovery from drowning, which is just as severe as the original asphyxia.

Galvanism has been recommended, but the only really serviceable way in which it can be applied is by means of needles

thrust into the intercostal, pectoral and diaphragm muscles, so as to reach the branches of the phrenic nerve and the larger nerves of the solar plexus.

Government, like a good parent, has expended vast sums of money to save the lives of her children along her maritime coasts, but the outlay has not always been judiciously made. Except the regulations given above, there is nothing placed in life saving stations, in the way of appliances, for restoring the drowned. There should be a galvanic battery and abundance of blankets, as well as the means of providing warm water in case of need, in much larger quantities than could be obtained from a small stove and small kettle. There should be also some means of communicating from station to station when assistance is needed, as is sometimes the case. But in all probability the deficiencies that may be apparent in the Government life saving appliances, will be remedied ere long.

Below is given the record of some cases where the parties have been successfully treated by the writer's method:

Some years ago an accident occurred at Tom's River, in this State, where a number of persons were precipitated in the water. Master W. was taken from the river in about eight minutes after the accident, as nearly as the time could be computed, and was resuscitated in about thirty minutes.

At the same time Miss S. was taken from the water, while the attendants were engaged with Master W., so that she must have been in some time longer. She was fully resuscitated in an hour, but came very near dying from secondary shock in about two hours after resuscitation, and was saved after only the most strenuous exertions by means of artificial respiration, friction and stimulants. She, however, fully recovered, and is still living.

Master D. while sailing in the river had his boat capsized by a flaw of wind, and sank after about one minute's struggle. The coachman, seeing the accident, procured a boat and rowed to his assistance. He found him grasping the grass at the bottom of the river, in water about four feet deep. From the time that the accident occurred until he was taken from the water, not less than ten minutes must have elapsed, and from the time he was brought to shore until medical assistance could be obtained was fully ten minutes more, so that twenty minutes elapsed before efforts for artificial respiration were made. In fifteen minutes

gave the first gasp, and was breathing regularly in forty-five ıutes. He was still living a few years ago when last heard from.
Miss A., from the South, while bathing in the ocean, was ried beyond her depth by the force of the current. From the ıe of the discovery of the accident until the bathing master ıld reach her with his boat, not less than six minutes could ve elapsed. To obtain medical assistance occupied ten adional minutes. Natural respiration commenced in fifteen nutes after first manipulation.
Mr. R. while fishing was upset in a collision, and becoming tangled in his boat, was dragged some distance. When scued he was inanimate, but there was no means of determing the length of time he had been so. When brought to shore, ere were persons who had seen artificial respiration practiced, ıd commenced efforts at restoration. When medical assistance rived, it was more than an hour after the accident, and he was eathing regularly. Those present thought they had been cupied about fifteen minutes before he gave a sign of returng animation.
Fortunately, the opportunities for exemplifying any rational ethod of treatment for the drowned are rare. A period of ars necessarily elapse before any system can be verified, expt by way of experiment upon animals, which as far as tificial respiration is concerned, is very unsatisfactory. Hence ıe writer has had no opportunity of comparing his plan with ıat of any other person operating. His attention was called the subject by reason of living near the sea-side, where sualties occur every year. It was evident that some method resuscitating the drowned should be devised, where one perıı could do the whole work in the easiest and speediest manner. uch valuable time is often wasted in giving others directions hat and how to do, and in having these inefficiently carried ıt from the over-zeal or over-excitement of those assisting. ence this simple plan which we have found effective, together th some reasons therefor, derived from a study of natural ethods, and tested by the demands of actual practice.
November 7th, 1879.

ADULTERATION OF FOOD, ETC.

ALBERT R. LEEDS, PH.D.

There are certain well-understood and natural standards, by which the purity and genuineness of any commodity used as food are judged, and any willful debasement below these standards for purposes of gain is adulteration. The adulteration may be effected either by the addition of substances for the purpose of increasing the bulk or weight, or to change and improve the appearance, or to artificially increase the strength, or it may be effected by the abstraction of some of the more valuable constituents. When willfully done, all of these alterations are *fraudulent;* when they arise in the process of growth or manufacture without intention, they are to be classed as *accidental*, and blameworthy only when a want of due care can be proven. Of the fraudulent adulterations, there are three kinds—the harmless, the deleterious and the poisonous. The examinations given later were made to find out the character and extent of these three classes of adulterations at the present time. And it should be carefully borne in mind that hasty and sweeping generalizations upon these subjects are of necessity misleading, because the nature and extent of the adulterations practiced from time to time, vary with the abundance or scarcity of particular commodities, with the sharpness of competition in trade, with the ignorance or alarm of the community, and with the absence of, or unwise or wise, legislation upon the subject. But sufficient, I think, has been done to warrant me in asserting, that adulterations of a kind advantageous to the pocket but not injurious to the health, though extensive, are by no means so great as is popularly supposed; in the second place, that deleterious adulterations are limited to a few commodities, and that with the exception of the use of poisonous pigments to a very limited degree in candies, and of arsenic in wall-papers and articles of use and wear, there is no good evidence of the use of poisonous adulterants whatsoever. The statements which have been going

the rounds of the press to the effect that cayenne pepper, mustard, curry powder and other spices, are adulterated with compounds of lead and mercury, that sulphuric acid is commonly used in the making of vinegar and certain wines, that milk is ordinarily adulterated with anything more dangerous than water, that pickles are frequently colored green by copper, that teas contain salts of copper and arsenic, etc., etc., are, in the light of any investigations made by chemists of good repute in this country, utterly false. While no pains should be spared by Boards of Health to ascertain the facts, and from time to time warn the public concerning adulterated commodities, yet the reiterated publication of such absurd and exploded fictions as the above, should bring down upon their authors, as it has, the contempt and derision of a better instructed community. With these words of introduction, let us pass to a consideration of the results obtained in the examination of certain of the principal articles of food.

BREAD.

It is stated that potatoes are frequently, and indeed commonly used in the making of baker's bread. They cannot properly be called an adulteration, because the bread so made is excellent and palatable, as I have found from the constant use of such bread in my own household. The receipt used calls for half a pound of boiled potato to three and a half pounds of flour. The objection is that bread made in this manner, and by the use of potato yeast as well, holds more moisture than that made entirely from wheaten flour, which is an extra profit to the baker when the bread is sold by weight. We did not specially inquire into the substitution of inferior or damaged flour in place of superior flour, for two reasons. In the first place, at the time of making these inquiries the price of flour was exceptionally low, and the temptation to lower the quality of the bread proportionally small and in the second, the buyer must and does discriminate between sweet and nutritious bread and the reverse. It is the attempt to improve the appearance of bread made from inferior or damaged flour, by the use of deleterious substances, such as alum, blue vitriol, borax or white vitriol, that is more especially inimical to health, and to the search for these bodies, and for chalk as well

ıich is said to have been detected in some instances in bread, r efforts were directed. But in no case, though a number of ıves made by bakers largely supplying the poorer classes were amined, were any of these adulterants found except alum. In e ash of two samples an amount of alumina was found, cor- ɜponding to seven grains of alum to a four-pound loaf. In ıother sample, alumina corresponding to a weight of eight ains of alum in a four-pound loaf; in another to fifteen and ıe-quarter grains; in another, and the worst sample, to twenty- ree grains. Admitting that as much alumina as would be uivalent to eight grains of alum might be derived from the h of the flour in its natural condition, an admission usually ade in the analysis of bread by the public analysts of England, t the above results would appear to warrant us in believing at the use of alum in bread-making is practiced to a certain tent.

According to Liebig, the addition of alum renders the bread ry light, elastic, firm and dry, but at the same time a com- nation with the phosphoric acid present is probably formed, ıd this phosphate of alumina being with difficulty soluble, nds to diminish the digestibility of the bread so made. More- er, according to Liebig, alum forms with the gluten of the eal an insoluble compound. These opinions of Leibig are uch disputed at the present time, but in the absence of very nvincing arguments to the contrary, we prefer to adhere to the ıchings of that illustrious chemist. With regard to blue vitriol poison), which has the same effect on poor or damaged flour alum, there is no question. As above stated, I have no posi- ve testimony gained from analysis performed in my own labo- tory, but in this connection it is important to note the results tained by Dr. E. Waller, in the examination of bread sold in e city of New York.*

Of the fifty-one samples examined, he found all but fifteen ntained minute amounts of copper. But as the amounts were cessively small he was led to examine other articles which ght at times be used in bread-making, such as potatoes, white d yellow Indian meal, and found they contained traces of ɔper. In baker's yeast, no traces could be found. Besides the ɔve sources of copper, in the majority of cases the amounts of

*Report of Board of Health of New York, 1873. p. 449.

copper found were not greater than might have been derived from the use of copper utensils in preparing the bread, or the materials used in making it. In only two cases was the amount of copper so great as to render it probable that it had been intentionally added in the making, and in these cases probably did not exceed two-fifteenths of a grain of sulphate of copper to the pound of flour. Six other samples were probably adulterated with alum, and two contained both alum and copper.

SALERATUS.

The probability is strong that but little systematic adulteration of this substance is practised. In various samples purchased in Hoboken, and examined for impurities, none were found.

Of twenty-eight samples sold in the city of New York, and examined by Dr. E. Waller,* all but two consisted of bicarbonate of soda more or less pure. The impurities were mainly common salt, sulphate of soda, lime and silicic acid, and were due to the process of manufacture of the bicarbonate. In one of two exceptional cases, the adulteration consisted in the addition of flour, a harmless though fraudulent dilutent; in the other, in the addition of nearly twenty-five per cent. of sulphate of lime, or *terra alba*.

CREAM OF TARTAR.

The cream of tartar examined by Dr. Waller, was found to be in all cases adulterated with *terra alba*. To such an extent was this injurious substance added, that in most samples, the *terra alba* predominated. In one case 61 per cent. of *terra alba* was found, in another 86 per cent., so that, according to Dr. Waller, "the cream of tartar sold in New York is shamefully adulterated —more so, probably, than any other article sold by the grocers."

Among the samples purchased in New Jersey, sulphate of lime was found to be a common adulterant, the percentage in one instance amounting to 34.04 per cent. The adulteration is one so easily carried on, and so unlikely to be detected by the casual buyers, that it appears to be very extensively practised.

*Report of Board of Health of New York, 1872.

BAKING POWDERS.

The essential constituents in the best baking powders are ream of tartar and bicarbonate of soda, to which are some- imes added tartaric acid and carbonate of ammonia, the salts eing prevented from mutual decomposition by the addition to he mixture of a little starch. A number of samples examined y the author were found to be unadulterated. They were of inds in extensive use and bore an excellent reputation, two of hem having been ordinarily used in my own household. But luring the course of the past year, very many analyses of these owders have been made by Dr. H. A. Mott, and he has found hat they are largely adulterated, alum, *terra alba*, etc., being sed in the manufacture of a large number of them. In one ariety, known as the "Patapsco Powder," there was 20 per cent. f burnt alum; in "Andrews," 22½ per cent.; in the "Charm" aking powder, 30 per cent., and in "Dooley's Standard Baking owder," 26½ per cent. No cream of tartar was used in any one f these powders, while in one of them the starch amounted to 7 per cent. Since the time of his earlier publication,* the tatements therein having been challenged, Dr. Mott has con- inued his inquiries, and has already reported twenty-three rands of baking powder as being made with burnt alum, the otal number probably being much greater.

SUGAR.

Several samples of white sugar, differing in the fineness of the ranulation were examined. They were found to contain no ineral substances, except those naturally contained in the mi- ute amount of ash, *no metallic bodies, even in traces*, no glucose, nd no flour or starch. So far as the chemical tests applied ould show, and to the best of our knowledge and belief, these igars were pure. They were purchased at the meanest shops in e poorest neighborhoods.

With regard to the use of glucose in brown sugar and molas- s, I am unable to speak from personal knowledge. It is the inion of Prof. Sharples, that if the former is the case, it must very seldom, since he records but one case within the last two

*Scientific American, Nov. 16th, 1878.

years.* According to Prof. R. C. Kedzie, the adulteration of table syrups with glucose is practiced to a very great extent. While the glucose itself is harmless, it is a loss to the consumer in the respect that its sweetening power is much less than cane sugar, one pound of the latter having, it is said, the same sweetening power as two and a half pounds of glucose. Moreover, in the table syrups examined by Prof. Kedzie, the glucose was frequently accompanied by large amounts of deleterious substances, one sample containing, in the gallon, 71.83 grains of free sulphuric acid, .28 grains of sulphate of iron, and 363 grains of lime. The serious illness of a family was attributed to the use of this particular syrup, and there were other samples examined in which the adulteration was still greater. Of seventeen specimens of syrup examined, two were made of cane sugar, and fifteen of glucose.

CONFECTIONERY.

In an extended examination made by Dr. H. Endemann† of the candies sold in the city of New York, special attention was paid, 1st, to those substances which were employed to take the place of the sugar, in other words to give "bulk;" 2nd, to materials used in coloring; 3d, to extracts employed in flavoring. Of substances of the first class, clay, gypsum, starch, and lampblack were found; the first body named being present to the extent of 3.6 per cent. in some lozenges. The last as an admixture in liquorice gum-drops.

The red coloring matter was found to be either carmine or analine red, both of which, when used in such small amounts, are harmless. Other red colors, like vermilion and minium, which are poisonous, were not detected.

Blue colors were either ultra-marine or Prussian blue. The yellows were chromate of lime, chromate of lead, chromate of baryta, gamboge, saffron and various yellow plant extracts. Of ten samples of yellow colors examined, five were found to consist mainly of chromate of lead. No copper or arsenic was detected in the green colors examined.

While the flavoring extracts were mainly artificial, and while the ethers composing them are poisonous when taken in consid-

*Treatise on Hygiene and Public Health, Vol. II, p. 370.

†Report of Board of Health of New York, 1872.

rable quantities, yet it is questionable, according to Dr. Endemann, whether, when taken in a highly-diluted state, they are to be regarded as poisonous. According to Prof. S. P. Sharples* even the perfectly white candy, which is free from injurious coloring matters, is frequently flavored with fousel oil (essence of banana), oil of bitter almonds (nitro-benzole), prussic acid in various forms known as almond flavor, and various other essences and extracts which are poisonous in their nature, and which are used in large excess by the makers in order to give a strong flavor. The same authority states that glucose sometimes makes up almost the entire bulk of candy, and that most candy probably contains it to a greater or less extent. In such cases, the injury arising from the adulteration does not result from the glucose, but from the free sulphuric acid and the excess of sulphate of lime which commercial glucose is apt to contain.

I have quoted thus largely from the results of examinations made in New York and Massachusetts, for the reason that my own analyses of candies, which were confined to the search for *deleterious* constituents and flavoring matters, did not show their presence. And while there can be no question of the existence of injurious adulterations, yet that they are universally or even generally practised would appear not to be the case.

STARCHES AND FLOUR.

An examination of several samples of starch was made with the microscope, but no impurities were detected. Their chemical and physical properties, also agreed perfectly with those of genuine starch. No examinations of flour were made, because there was no reason for suspecting that any adulteration of this article was practised at the present time in this country, the employment of flour made from damaged wheat not being a matter coming within the scope of the present inquiry.

MILK.

A great amount of sensational literature has been published concerning the adulteration of milk, it having been asserted that it is customary to add to the milk sold in our large cities whiting,

*Adulteration of Food. Treatise on Hygiene and Public Health, vol. II, p. 363.

magnesia, chalk, and even sheep's brains. These statements are entirely negatived by the testimony of all the gentlemen who have been officially charged with the inspection of milk, *the addition of water to dilute and of caramel to color*, according to their statements, being the sum of the adulterations. It was, of course, quite needless to multiply analyses of milk under these circumstances—the important matter was to discover what means had proven effectual in suppressing the evil. At the outset great difficulty was encountered for the lack of an authorized standard as to what should be entitled pure milk. This difficulty has been overcome, the New York Board of Health having succeeded in establishing in the courts of law that the specific gravity of pure milk shall be taken at 1.029; while in Massachusetts, Rhode Island and Maine a chemical analysis of the milk is required by law, and it must be shown not to fall in the percentages of its essential constituents, below certain standards generally accepted at the present time in this country and in England.

It is stated that during the years 1874–75*, thirty-seven convictions were obtained in the city of New York under the sanitary ordinance covering the adulteration of milk, and the opinion is emphatically expressed that the arrest and prompt punishment of those who tamper with an article of daily use has already been attended with salutary effects, and, if successfully continued, must ultimately stop the evil. "The practical lesson to be drawn from the experience of many years, and of many City Boards of Health, is that statutes alone are powerless to guard against the watering of milk, which will always be practiced to a greater or less extent, unless the watchful supervision of a competent inspector is brought to bear against the evil." The same result has followed the systematic warfare which has been waged in Boston and elsewhere, against the practice of watering milk, as may be seen from the writings and reports of Messrs. Sharples† and Merrick,‡ State Assayers of Massachusetts, and Mr. H. W. Vaughan, State Assayer of Rhode Island.

*Report of Board of Health of New York, 1874-75, p. 64.

†Milk Analysis, Proc. Amer. Pharm. Ass'n. Milk Analyses, Proc. Amer. Acad. Arts and Sciences, Boston, Vol. XII. 1877.

‡13th Annual Report, Boston Milk Inspector, 1878, p. 21.

TEA AND COFFEE.

In the examination of teas, attention was directed to the determination of the percentages of ash and of tannin; to the analysis of the ash for the discovery of foreign mineral substances, and to the examination of the structural characters of the leaves under the microscope, in order to detect the presence of other plants.

An analysis by Mulder of black and green teas, gives for the percentage of ash in the former 5.24 per cent., in the latter, 5.56 per cent.; his determinations of tannin, give for black tea 12.88 per cent., for green tea 17.80. While the analysis of various kinds of tea, representing tea grown on various soils, in different seasons and collected at different ages of the plant, afford other percentages for the ash and tannin, yet it is safe to say that any wide discrepancy from the above results, would indicate either that we were dealing with teas containing foreign mineral substances, or with teas largely admixed with the leaves of other plants.

A sample of what was sold as medium Japan tea, yielded, according to one analysis, 6.6 per cent. of ash. A duplicate specimen of the same, gave 7.0 per cent. of ash. This high result pointed to the probable presence of foreign mineral matter. Under the microscope, many leaves other than those of the tea-plant were found.

Mixed tea, sold at the price of thirty cents per pound, yielded 6.5 per cent. of ash, and contained 7.9 per cent. of tannin. It was free from foreign mineral matters, but had abundance of other leaves.

"Mixed" tea, sold at twenty-five cents per pound, yielded 6.9 per cent. of ash, and contained 8.2 per cent. of tannin.

Examinations were made of a number of low-priced teas in a similar manner. After soaking, the leaves were mounted on glass slides, and compared under the microscope, both with the leaves of what was sold by the most reputable grocers of New York, at the highest prices, for genuine tea, and with the microscopic enlargements of the genuine leaves of the tea-plant, figured in Hassall's standard work on the "Adulteration of Food." In the lowest priced teas it was difficult to find in

this manner, any genuine leaves whatsoever. The low percer of tannin found in such samples, likewise indicates the prol presence of a large proportion of foreign leaves.

It is stated that plumbago, indigo, Prussian blue, clay, s stone, gypsum, etc., are employed either in the facing of te to give weight. The small percentage of iron found in the of the teas examined, would appear to show, that if Pru blue were employed at all in facing them, the amount used have been insignificant. The other mineral matters enume in the list given above, we did not succeed in finding. Suffi evidence, however, was afforded by the microscopic and cher examination, to show that while the adulterants of tea are m harmless, they are added to such a degree as to make it o the most adulterated articles of food.

The samples of coffee examined, on the contrary, did no pear to be mixed with chickory or other foreign berries, although of very poor quality in many instances, they were adulterated.

MUSTARD.

Mustard is made from the seeds of the black and white tard plant, and, when pure, consists of the flour made by c ing and sifting these seeds, together with more or less o husk. Any foreign substance, whether vegetable or miner an adulteration. It is stated that clay, chrome yellow, chro of potash, cayenne pepper, gypsum, gamboge, turmeric, gi yellow ochre, potato starch, pea flour, wheat flour, and the of various foreign seeds have been used as adulterants, b this list none were found in the various samples of mustard lyzed, except clay, gypsum, turmeric and wheaten flour. samples analyzed were purchased at the localities named: N ——— ———, Hoboken; No. 2, corner of —— and W streets, Hoboken; No. 3, corner of —— and James streets, ark; No. 4, "Bovine" mustard; No. 5, "Colman's" mus The table of analyses gives, in addition to the adulterations fo the percentage of ash and fixed oil. Pure mustard contains 3.7 to 4.7 per cent. of ash, and if the percentage falls below amount, some organic adulterant is probably present; if, more likely, the percentage exceeds this amount, some mi

substance. The percentage of fixed oil, in like manner, should be included within 33.9 and 36.7 per cent. The amounts of mustard given as present, were calculated from the amounts of fixed oil found, and, of course, can be regarded only as approximate determinations. The clay and gypsum might, to a certain extent, have been introduced in the form of dirt, and, as such, would be classed as accidental adulterations. The flour and turmeric have been customarily added to mustard to improve, it is so stated, its palatability, and to heighten the color. The practice, it is moreover said, is so well known and allowed, that the adulteration should be regarded not only as harmless, but in no sense fraudulent.

TABLE OF ANALYSES OF COMMERCIAL "MUSTARD."

Sample.	Ash.	Oil.	Mustard.	Wheat Flour	Turmeric	Clay.	Gypsum
I.	4.60 p. c.	17.45 p. c.	44 74 p. c.	Present.	Absent.	Present	Present.
II.	11.67 "	24 00 "	68.40 "	"	Present.	(Salt.)	"
II.	4.64 "	21.30 "	55.60 "	"	"		
V.	18.38 "	20.28 "	52.70 "	"	Absent.	Present	Present.
V.	3.78 "	30.14 "	81.10 "	"	"	Absent	Absent.

No. II. contained a large quantity of common salt, together with vinegar. As it was already prepared for table use, these ingredients were introduced in the process of mixing.

No. III. contained very slight traces of mineral substances, not fairly attributable to the ash.

The percentage of ash in No. IV. is very great, 18.38 per cent. and it is difficult to account for so large an excess above that found in genuine mustard, except on the supposition of intentional addition.

The application of the name mustard to "mixtures" of mustard and flour, though sanctioned by immemorial usage and defended on the ground that mustard, without the addition of flour, is too pungent for table use, we regard as a serious mistake, and one, which, if corrected would benefit both the purchaser and honest manufacturer, for were the spice sold as a mixture, the

amount of pure mustard it contained being stated, the honest manufacturer would be put into a position to secure the just reward of his honesty, and the purchaser would know how much of what he paid for was mustard and how much was flour or something else.

VINEGAR.

The adulterations looked for, were the mineral acids, nitric, hydrochloric and sulphuric, though more especially the latter: the organic acids, pyroligneous acid, tartaric, malic and citric acids; metallic substances of every kind, but more particularly, lead, copper, arsenic, zinc and tin. The percentage of acetic acid in every case was likewise determined, since in good vinegar, this percentage should not fall below 4 per cent., and a lower percentage than this indicates the presence of an undue amount of water.

The samples were purchased as follows: No. 1, corner of —— and Willow streets, Hoboken. No. 2, corner of —— and Grand. No. 3, corner of —— and Grand. These, with another sample, No. 0, whose place of purchase was not noted, were all purchased at the price of five cents a pint, and this price was asked, so far as we could ascertain, by the grocers generally throughout the city. And yet the purchaser could have ascertained by his own taste and inspection, that the vinegars thus sold were of very different strengths and quality, the amount of acetic acid in one case being as much as 25 per cent. greater than in another.

No sulphuric or other acid, except acetic, was found in any sample.

No copper or other metal was found, except *lead.*

Lead was present only in traces; even in No. 2, a white vinegar in which the largest amount of lead was found, the quantity was very minute. Sample 1 contained 4.2 per cent. of acetic acid; 2, 4.10 per cent.; 3, 3.4 per cent.; 0, 4.5 per cent. So far then as the strength of the vinegar is concerned, none of the samples can be regarded as falling below the standard, except No. 3, which contained only 3.4 per cent. of acetic acid. The sample No. 1 contained myriads of the "vibrio aceti," and other animalcules, multitudes being visible even to the naked eye.

PICKLES.

igent search was made for pickles of suspicious appearance, ıumerous stores were visited with the expectation of finding pickles to which a bright color had been communicated by :ial means; but the search was unsuccessful, and the sam- ınalyzed in the laboratory afterwards, proved to contain no :rious ingredient. Especial attention was given in the h for traces of *copper*, but none whatever were found.

ese remarks apply not only to pickles of superior quality, those bottled and labelled by Thurber & Co., N. Y., and e & Blackwell, England, but to samples bought haphazard merous stores and not bottled.

CANNED VEGETABLES AND MEATS.

easiness in the use of canned vegetables and meats has been :d by reports of many cases of sickness so arising. When neats have been tainted or improperly canned, sickness t' be so produced; but to discover by the examination of :d articles that they were of a dangerous quality was, ıusly, a very difficult matter. We contented ourselves, fore, with an examination of canned corn, tomatoes and vegetables,for metallic impurities, especially lead,tin and cop-

In the cans which were examined such impurities were not l. In one instance, however, several globules of mercury of derable size were discovered, probably due to the accidental :ing of a thermometer employed during the canning. The ving important paragraph has been condensed from a report shed in an English scientific journal concerning the use of *d peas.*

the city of London, in 1877, the vendors of several cans of ıred peas, in which the analyst of the district, Mr. C. H. e, had found quantities of copper, varying between a quar- nd a half grain, were fined. In the medical evidence ad- l in connection with the case, Dr. Parry took the ground ıince copper is found in minute traces in the human body, it t legitimately be used in the preparation of peas for human

But Dr. Guy, Dr. Dupre and Dr. Tidy all took the ground the *smallest* admixture of copper, when contained in any

preserved article of food, ought to be viewed as an adulteration. The copper, it is well known, is added solely for the purpose of improving the color of the preserved vegetables, and so giving a fictitious value to an otherwise inferior article.*

CAYENNE PEPPER.

No compound of lead or mercury were found in the samples examined. In one sample the ash amounted to 5.4 per cent. and in another to 15.6 per cent. Both contained some red ferruginous earth, the latter sample in considerable quantity. It is stated that the ash of the unground pods is colored red from the presence of oxide of iron, and the red ferruginous matter may possibly have been derived from this source; but the very large percentage of the ash in one sample certainly makes it questionable whether or no in this instance the adulteration is to be regarded as an accidental one. Terra alba as well was found in the latter sample.

LIQUORS.

The charge constantly made that liquors are enormously adulterated, has not been substantiated in the cases where analyses have been made by competent persons. In the report made by the Massachusetts Inspector and Assayer of Liquors, he states as the result of his examinations during the past two years, that in the ardent spirits (brandy, whisky, gin, rum, etc.,) examined, water, sugar, caramel or like coloring matter, and in one case methylic alcohol, were the only adulterations found. No cocculus indicus, strychnia, picric acid, nor any other bitter except that of hops and malt, was found in the samples of beer examined, and the wine contained nothing but what was naturally derived from the grape.

A great number of samples of whisky, including what was vended at the meanest liquor saloons of the city, were examined a short time ago under the auspices of the New York Board of Health, and the badness of the samples consisted in the increasing amounts *of water and fousel oil*, which they contained.

This result is similar to that recorded in the Report on Food and Drugs, recently published by the English Commissioners of

*The Analyst, vol. I, pp. 183, 203.

ernal Revenue. The samples of whisky which were sent up ıe Board for examination, were carefully examined, but no lteration was found, except the presence in one of the samples some pungent matter resembling cayenne pepper. The ıicions had probably been caused in large degree, by the of new spirit containing an excess of fusel oil and other ıral impurities.

ı the two samples of gin which were sent upon the charge of lteration with water, the Board did nothing except to make etermination of the strength, leaving, in the absence of a dard as to the degree to which gin may be adulterated, the ıtion of undue watering or otherwise to the consideration of Justices. Of the beer examined, one sample contained a ıin amount of salt, which, on examination, proved e no greater than what was naturally present in the ingre- ts used in brewing; two brewers were detected using grains 'aradise, and one was found using licorice.

ıe same report supplies much evidence to show that the ılar impressions concerning adulteration are greatly exagger- , for of the 14,244 samples of suspected articles examined at government laboratory at Somerset House, but a compara- y small number were shown to be adulterated. Besides the ors just mentioned, a few of the more important articles may poken of by way of illustration. A sample of pepper was ed to be adulterated with sand, but the quantity which was d was not more than may be present in pepper in the whole , as imported. Of three hundred and twenty-five samples bacco, sixty-eight were found to be adulterated, the adul- ions being sugar and licorice; cigars, certified by the local yst to contain opium, proved, on examination at the gov- ıent laboratory, to contain not the slightest trace of that . Coffee, however, was found to be frequently adulterated; adulterant most recently detected being date stones, which being roasted, ground and mixed with the coffee, readily ve the general public.

COSMETICS.

ıce substances detrimental to health are frequently em- d in the preparation of cosmetics, some well-known articles is class were examined with the following results:

Mme. Rachel's Toilet Cream.—Purchased at a pharmacist's in Washington street, Hoboken, at the price of sixty cents per bottle. It consisted largely of finely powdered carbonate of lime or chalk, and carbonate of magnesia, suspended in water to which some perfume had been added. No metallic salts were present, except a trace of iron and some oxide of zinc—the latter in not inconsiderable quantity.

McNeil's Sulphur Cream.—It is composed of sulphur and oxide of zinc. No other substances were found except traces of lime and magnesia.

Lily White.—This consisted of gypsum and a fine white variety of unctuous clay, with no organic matter, other than that due to the small amount of perfume present. This was probably the least deleterious of the cosmetics examined, and while having a tendency to close up the pores of the skin, would probably do as little injury as any of the bodies of its class.

The various preparations used in dyeing the hair were not examined, since the presence of lead in large quantities in these dyes has been recently exposed in the reports of the New York Board of Health, and the many serious consequences to life and health resulting therefrom abundantly pointed out.

DISINFECTANTS.

There is considerable danger of the public being imposed upon by the sale of disinfectants, which have received fanciful names, and while containing nothing but low-priced and familiar disinfecting substances, are sold at prices much exceeding their commercial value. It is safe to say that the best disinfectants are generally well known, and have been put to extended use and most severely tried by sanitary authorities in this and other countries. The State Board of Health of this State has circulated thousands of circulars, giving precise directions concerning the nature and employment of the most reliable disinfectants. Hence the advertisement of these bodies, or mixtures of these bodies either with one another or with inert foreign substances added to increase bulk or weight, under fanciful names which give no indication of the true composition of the disinfectant, can have the tendency only to mislead, and to a certain extent defraud, the purchaser. Where copperas,

hloride of zinc, blue stone, etc., are sold under their own names, he amount to be applied can be intelligently determined. But f disinfectants of unknown composition are used, the amount o be applied cannot intelligently be decided upon, nor can the emedy of the proposed evil be certainly brought about.

Of this character is the "Instantaneous Disinfectant Powder," old by the New York Deodorizing Company, 170 Broadway, lew York, at the price of twenty-five cents per pound. It onsists principally of ferruginous clay, with some common salt nd sulphate of iron.

The same remarks apply to the "Sanitary Solution," sold by he same company, at the price of fifty cents per pound. It is a olution of blue stone and chloride of zinc in water.

ARSENICAL COLORS.

Although a subject not directly connected with the adulteration of food, etc., yet the common employment of arsenical colors in objects intended for household use early attracted the writer's attention. The presence of large amounts of arsenical pigment in the brilliant green wall-papers in very common use, was confirmed by the examination of a great number of samples. Recently, the State Board of Health, of Michigan, in order to impress upon the people the extent to which this manufacture of arsenical wall-paper is carried, has issued to the principal libraries of the State one hundred copies of a volume containing samples of such papers, and reports of the very numerous cases of sickness resulting therefrom.

It would be difficult to enumerate all the articles of common use in which arsenic is present, sometimes very unexpectedly. Recently, the author found in a green taper, used by the children in a toy house, a considerable amount of the arsenite of copper. Besides wall-paper, letter-paper, fancy paper of various kinds, card-board, printed tickets, etc., are colored with arsenical pigments. Artificial flowers, green papers used in the ornamentation or wrapping of candies, green tarlatan employed as an article of dress or in the protection of picture-frames, chandeliers, &c., are similarly colored. Since these arsenical pigments are simply fixed upon the fabric by the use of starch

or size, they readily detach themselves, and float in the surrounding air.

CONCLUSION.

Having endeavored to ascertain, as far as the time and means at our disposal would allow, the facts concerning the matter of adulteration, it will be proper in conclusion to say a few words concerning the means of regulating the evil, and of restraining it within as narrow limits as possible. We regard these as:—

Primariy, a sensitive public morality upon this matter, aided by the co-operation and sympathy of the press. These we have; the public being heartfelt in its denunciations of the crime, and the press being keen and vigilant to ferret out and expose the adulterator and his wares.

Second, the duty of Health Boards to examine at frequent intervals into the purity and genuineness of articles of food and medicine, and to keep the public instructed upon these points.

Third, to discover what legislation would be wise, and then to have it so explicitly enacted that the laws would really defend the public, and not, as has frequently been the case, shield the adulterator.

Finally, the appointment of a suitable number of public analysts and inspectors, whose duty it shall be to see that the provisions of the law are carried into effect; since otherwise, the experience in England and elsewhere has shown, the laws concerning adulteration remain but dead-letters on the statute-book.

DISINFECTION.

EZRA M. HUNT, M. D.

The design of disinfection is to remove from the air about us either those infective particles which are the cause of specific diseases, or to correct any deterioriation of air which is unfriendly to general health. The air for instance may have in it atoms floated off from a scarlet fever patient. If so, we seek by scattering them to diminish the probability of infection. Or by active ventilation we may drive them completely away. Or it is possible that we may so neutralize them by some chemical or other action, or so absorb them, as to remove their infectiveness. Or it may be that by a treatment of the person we may place him or the parts of him which come in contact with the air in such a condition as to be refractory to the reception of the floating particle. Practically it is found that free and continuous dilution of the air greatly limits its infectious power. It is probable that this is more than mere dilution or driving away. Where air is actively in motion, it is so brought into contact with infected particles as the more rapidly to change them, so as to deprive them of their power to impart a special disease. At any rate no fact is more fully established than that ventilation is favorable to the limitation of the infective diseases.

There is also demand for disinfection of such air as may not be laden with specific infective particles like those of scarlet fever or small pox, but which nevertheless is befouled by organic matters of various kinds. Such air is greatly prejudicial to health by causing a lowering of vitality or an irritation of important organs, and so often gives rise to consumption, stomach and bowel affections, and to other maladies affecting the whole system. So much is this the case that foul air is believed to be generally the most potent excitant of disease. Mere dust in the air may irritate mechanically, or its conditions of heat and moisture may favorably or unfavorably affect those who breathe

it or are surrounded by it. These however do not come within the remedial agency of disinfection. Neither does odor necessarily demand sanitary disinfection, since all odors are not infectious, and all apparently odorless atmospheres are not the safest. As, however, bad odor is so often a result of the gases of decay it is usually an indication for the use of disinfectants, and the cessation of the odor is an indication that the disinfectant used has been effective. We must not confound the substitution of a new odor with the destruction of a former one. When any article, having no odor of its own, uniformly counteracts foul odors, we may safely value it as a disinfectant.

AIR AS A DISINFECTANT.

Even in so elementary an outline, it is evident that we can never vacate or supersede air as a disinfectant. Air, above and beyond all other things, is the material on which we must rely to purify air. It often needs to be air in perceptible motion, and without draught upon persons, and yet moving at a rate to cause draught. Its condition of heat or moisture will have some bearing on its effectiveness as well as its own condition of purity or impurity when introduced. There is room for plain common sense and thought, as well as for scientific study on the subject.

We do not always purify a room or disinfect its air by opening a window. The direction of the wind, the condition of moisture, the unraised curtain or the distance of some corner in the room may leave the child in its bed breathing a very different atmosphere from that which exists just at the crevice made at the open window. Many a room so needs flushing with air in every corner and crevice that it can only be done when unoccupied. Five minutes of such airing is often a greater disinfectant than a window raised for a day. While it is not in our plan to discuss ventilation, we cannot properly advert to disinfection without an endeavor to impress the availability of air as a disinfectant, and the imperfect method in which it is sometimes applied, even when its general importance is recognized. In some states of the atmosphere, and in some conditions of crowded houses or close rooms, there is such necessity for rapid and general diffusion of new air, in cases of sickness, that we are ever to be on the alert to secure a thorough ventilation. Often there is far more risk

from closeness than from draught. Where there is danger from draught we often get help, but never complete substitution, by the use of disinfectants. When air is warm faster currents can be borne. The value of natural light, too, is not to be lost sight of, since it also aids in the purification of air.

WATER AS A DISINFECTANT.

Water can not be said to have a direct chemical action as a disinfectant. Yet it has an important service to perform. Moisture may so locate infective particles as not to leave them flying about in the air to be readily inbreathed. To this end oiling or wetting the skin in scarlet fever has been recommended as a method of fixing the particles which are shed from the skin in what is called the desquamative process. Water itself, with the air it contains, has some power of oxidizing infective particles. It is chiefly, however, as a promotive of cleanliness that the use of water is advocated for disinfection. Either in solution or suspension it conveys away organic material or promotes those chemical changes, which render them inoccuous. Yet it is to be remembered that moisture sometimes seems to promote the infectiveness of particles by dissolving or suspending them so as to be more easily absorbed. If heat is added to moisture, it awakens decay and stirs matter into activity, and so may render it more hurtful.

It is to be borne in mind that constant dampness is not favorable to cleanliness. In hospitals during an epidemic, it is not usual to scrub the ward floors and walls, as water fastens some particles to surfaces, and together with heat, seems to promote their active and deleterious agency. This does not apply to the usual working of households, or to that agency of water by which surfaces can be better cleansed than in any other way; if only for a little time the sick can be removed during the dampness or evaporation incident to the drying process. For the cleanness of the skin, of the clothing and of much of the surrounding material of our homes, there is no substitute for water.

Neither can any system of artificial disinfection take the place of the time-honored house-cleaning so common with good housewives. The thorough cleansing of floors and walls, the overhauling of closets, bureaus and corners must be occasionally

done in this formal inspecting way, while the scrubbing, and wiping, and carpet-shaking and removing into the open air and lime-washing make up a process too important to be superseded. In many cases of sickness, there needs to be the same methods, as applied to rooms, which should be adopted as soon as they can be vacated by the sick. Garments which are often the vehicles of infective particles are best cleansed by shaking in out-door air or by immersion in boiling water.

To those who will not thoroughly cleanse the house, the bed clothing, and furniture and all garments, at stated intervals, frequent movings are blessings in disguise, as they do afford some opportunity for pure air to come in contact with soiled materials.

OZONE.

It is claimed by some that nature has provided in the atmosphere an element in a state ready of appropriation by which disinfection can be secured, and that when not sufficiently found in the atmosphere it can be made available by artificial methods. It may be called an extra atom of free oxygen, a little more ready than the usual oxygen of the atmosphere and holding itself ready to compensate for any defilement of pure air for which its services are desirable. It is defined as three atoms of oxygen, occupying the same space as two atoms of ordinary oxygen, capable of yielding up one atom of oxygen, and yet ordinary oxygen remains. So it is a powerful oxidizer. The exact availability of this agent is not yet fully defined, but it is attracting so much of scientific attention, experiment and hopefulness that we need thus to make reference to it.

SULPHUROUS ACID OR SULPHUROUS ANHYDRIDE.

This substance stands at the present at the head of chemical disinfectants. It is made by burning roll sulphur, which, coming in contact with the moisture or aqueous vapor in the air is changed into sulphurous acid. The vapor thus formed is destructive to insect life and to man himself, if continuing to breathe it for a length of time. It is, therefore, only applicable to the thorough disinfection of ships, rooms or houses from which all persons can be removed. But its great penetration

even into trunks, clothing, etc., and its power of neutralizing the gases of decay and destroying the infective power of atoms, makes it of great and essential service. Although the odor is unpleasant in clothing and other articles subjected to it, this is dissipated by airing.

A house or room is disinfected with it, thus: Close the chimney and all access to the outer air, except the doors for egress. Break in small pieces the sulphur to be used and place it on an iron plate or in a metallic dish or pan, and set this on a pair of tongs or cross-bar over an iron pot in which there is water, or over a large box of sand, so as to avoid any danger of fire from small particles of the burning sulphur. A little alcohol placed in the pan and set on fire, or a few burning coals from the stove, will light the sulphur. A pound and a half of sulphur will be needed for each one thousand cubic feet of air space. Thus a room ten feet wide and ten feet long, and with ceiling ten feet high, 10x10x10=1000, would need this amount; or a room 8x8x8=512, about half as much. So soon as the sulphur begins to ignite the person should leave and close the door tightly. The burning will continue until the sulphur is consumed, which, if the room is properly closed, should mean until the oxygen of the inside air is converted into sulphurous acid. If the room at the start is not below a temperature of fifty, the change is more rapid. It should be kept closed for from four to six hours after the burning has ceased, and then should be well aired four hours before occupancy, but should not be slept in until eight or ten hours after being opened and aired. It will hasten the disappearance of the odor of sulphur to wash the wood-work and cleanse the walls. Although the sulphur process is a little troublesome, yet it is also troublesome to catch disease from an infected building or room. We may improve the air of a room in usual cases by other methods, but we cannot rightly disinfect an infected room with the people in it. Sulphurous acid thus formed, by its pungency, its penetration and its active oxidation is now believed to be of the greatest value for this purpose. The penetration of the sulphurous acid fumes is shown by the fact that test litmus paper, placed under the carpet and between the leaves of books, is turned bright red. It was not found that colored silks or bed and bedding were injured, while feather beds, pillows or clothing, hung up and in

the room, are penetrated with the sulphur fames. Where there has been a disease like small-pox, or any infection which has shown great virulence, or which is actively transmissible, this mode of cleansing is to be advised. Chlorine gas has been used in the same way, but is no better, and is destructive of metals and colors.

The sulphurous acid fumes, although they will by long continuance effect vegetable colors, attack iron, and be absorbed by cloth, leather, etc., do not seriously injure these in so short a time, unless it might be some very unstable colors of cheap prints.

Chlorinated Soda, Chloride of Lime. As it is very frequently desirable to purify the air of a room, when the sick person, or a family, cannot remove from it, we have, in some of the preparations containing chlorine, articles of much utility for this purpose. It is said that the value of chlorine, as a disinfectant, came to be noticed first by the exemption from cholera of the Lancashire district, where the chlorides were used by the operatives for bleaching purposes. Its value is no longer questioned. It is most available for sanitary uses in two forms.

The *Liquer Sodæ Chlorinatæ, or solution of Chlorinated Soda,* is a liquid generally offered in the market under the name of Labarraque's Solution, from the Parisian apothecary who introduced it. It is convenient for washing or bathing, and if of proper strength is a quick and valuable disinfectant. This can only be known by purchasing it from reliable sources. Saucers containing two or three tablespoonfuls should be used until there is no other odor perceptible in the room, and should be replenished as indicated by this criterion. At present prices a pint bottle is worth twenty-five cents.

Chloride of Lime (*Calcic hydrochlorite*) is cheaper, and valuable for most disinfecting purposes. The lime itself has some value, but in this preparation is chiefly of service as a means of holding, and giving off, chlorine gas, which, being readily liberated, any organic matters are seized upon and changed as to their constituency. Commercial chloride of lime contains from thirty to thirty-five per cent. of chlorine ready to be thus liberated, under proper methods of use. Where it is to be produced in large quantities it should be tested, as it varies in its charge of chlorine, and so in its corrective or disinfecting value. But it is ess

) than many other preparations, and as put up by reliable in pound packages, at from six to eight cents per pound, available. In quantities it can be had at two cents per It is a most excellent disinfectant, and, even in the sick an easily be borne in moderate quantity, unless there is irritation of the breathing apparatus.

tablespoonfuls of the dry powder is placed in a saucer d there, in the room, and just moistened with a little ad stirred with a penholder or small stick. If the atmos- already perceptibly bad it is best to moisten it with vin- l stir briskly, and to add more of the dry powder when : lessens. There should be frequent stirring and replen- f two or three teaspoonfuls each day, enough to keep a lor of chlorine perceptible in the room. If left unstirred ies encrusted with a carbonate of lime, and the air is not into contact with it sufficiently. The nurse soon comes : of the amount needed by the odor. When the saucers emit much smell of chlorine their contents should be into any place where disinfectants might be of service. oride should not be kept in closets among china or steel it slowly tarnishes and corrodes these. It should also when not in use, in a dry place, or in a sealed fruit jar. e of lime, either alone or mixed with recently-slacked ay, with advantage, be scattered about drains or any here there are foul smells. In common use the indica- mount can only be measured by frequent repetition, until a cessation of the foul odors.

e of calcium or quick lime is that prepared in lime-kilns. broken in small pieces or recently slaked in its usual tion for land, or for mortar, or for lime-wash, it is valuable infectant, both as an absorbent and as neutralizing some ases of decay. It may be used in all cases where there is filth, and where a powder can be scattered upon it. It be freely strewn about, day by day, until all odor is d. Since, in large masses of filth, it may hasten the f gases faster than it neutralizes them, powdered char- an equal amount of common plaster may be added.

popular "Calx powder" is made by powdering one bushel fresh charcoal and two bushels of stone lime and mixing Common lime and crushed charcoal may be thus mixed

but are not quite as effective. Ivory black or animal charcoal made from bones, and thus pulverized, presents with the same weight a larger surface than wood-charcoal, and is a more active absorbent.

The value of this and other absorbents is in the fact that they can take up many times their volume of gaseous products.

If, for instance, fresh powdered charcoal is mingled with a liquid or semi-liquid decomposing matter, the gases of decay will be condensed in its pores and rendered inactive until changed. If, instead of being mingled, the charcoal is placed over the mass so that escaping gases have to come in contact with it, a septum is furnished between the decaying mass and ourselves. As it does not act chemically, and we cannot measure the amount of gases emanating from the mass, one chief test must be the removal of odor. Gypsum, or plaster of Paris, dry coal ashes, dried peat, lime and well-dried earth have similar qualities. Not only as absorbing the foul gases, but as absorbing moisture they suspend or take away one of the conditions of putrefaction. It is important to secure for any thing that is foul, air deprived of moisture. There are many house-disinfectants, such as dry, sifted ashes, soot, charcoal and dried earth, which are quite available and well suited for drains, cess pools and out-houses and for all that kind of disinfection which seeks the entire removal of odor.

CARBOLIC ACID.

We do not give as great prominence to the use of carbolic acid as is generally given to it in the catalogue of disinfectants.

To it, undoubtedly, attaches the value of the creosote and coal-tar series, but its value is most difficult of adjustment.

As usually in the market, it is an indefinite mixture of phenol compounds of varied strength and potency. It is difficult to know what proportion is water, as the scent of a small quantity of these crude compounds is exceedingly persistent. The percentage of crystallizable acid is only known when it is ordered in quantities by sanitary officers under test. The public are not likely to get a uniform dilution.

Dr. Endemann, the chemist of the Board of Health, who is still an advocate for its use as an ingredient of disinfecting

fluids for general purposes, in the last report of the New York City Board of Health, speaks of it thus:

"Our ordinary methods of disinfection seem to be fully equal to the demand, yet there are customs which I consider entirely unwarranted, if we compare them with the results of the experiments described. I refer here to the use of carbolic acid for the impregnation of the air in sick rooms. If we should evaporate carbolic acid in the air to such an extent as would be required, the smell would be so strong that no human being could endure it for any length of time. It may therefore be asked why I have not recommended a discontinuance of the system. In answer to this I will state that I consider this homœophathic application of carbolic acid of practical value in so far as its smell, better than posted notices, warns strangers of the danger to which they expose themselves by remaining in an infected atmosphere." Again, he says, "from my statistics of the last six years, I have come to the conclusion that * * * the action of carbolic acid and its preparations has been more than doubtful, unless they were applied in such strength or quantity as is within the limits of the experiments I have cited. This can, however, but rarely be done, on account of the disagreeable and very lasting smell of this substance."

With such views we can hardly see how this chemist can advise a pint of fluid carbolic acid to five gallons of water, or a weak solution of forty to one hundred parts of water to one of fluid carbolic acid for out-of-door use merely "to warn strangers of an infected atmosphere," since it conveys an assurance of false security to those not strangers. If we could be assured of the quality of carbolic acid, a study of the experiments and experience of other authorities leads us to give to it, in common with other coal-tar compounds, some credit as a disinfectant. If it can be had, as prepared by Squibb, of certified strength, it is available, although not so good as some of the articles heretofore mentioned. The boiling of tar in any room where an infective disease exists, is of some service, and secures some of the benefit of the phenol compounds.

Dead oil or heavy oil of coal tar has been extensively used for the same purpose as carbolic acid, because it is cheap. It has in it carbolic acid, naptha, benzine and the heavy oil of coal-tar, all of which have some antiseptic value. There is now a process

by which the carbolic acid is extracted. For this and other reasons it is of uncertain strength, and should not be purchased by citizens without testing.

Thus far we have desired to confine attention mostly to articles which may need to be used for an infected room or house, or for the immediate vicinage. Next we note *disinfection of the person.* When there is need to use some disinfectant wash for the sick person, two tablespoonfuls of the chlorinated soda, before referred to, in a pint of warm water, is very good. A tablespoonful of chloride of lime in a pint of water, although not so agreeable, will answer the same purpose. A tablespoonful of borax in powder thus dissolved is also cleansing.

Permanganate of potash, which comes in purple crystals and keeps without change, is one of the best disinfectants for the person. It is most convenient for physicians, undertakers, etc., to carry with them for ready use.

A few grains are quickly dissolved in water in the proportion of a drachm to a quart. It is a very rapid oxidizer, of all kinds of organic decay, is odorless, and although colored, does not, in such dilution, cause any stain. An ounce of sulphate of zinc (white vitriol) to a quart of water answers also the same purpose.

DISINFECTION OF SECRETIONS OR DISCHARGES.

It has been quite positively shown that the infective power of cholera, typhoid fever, or other communicable diseases, resides in the discharges, or results from changes taking place in them a few hours after voidance. In scarlet fever, diphtheria, and whooping cough, there is reason to think that the scarf skin, the membrane and the sputa convey infection. It is always wise in sickness to take good care at once of all that separates itself from the patient. There is a sense in which it is correct to say that the person sick and his surroundings are not infective, if only the tidiest care be taken of all the products of the sickness. A breath saturated with antiseptics, a skin impregnated or anointed with deodorents and every excretion cared for limit the possibilities of disease, and make a sick room healthy to a degree not to be substituted by any other methods. It is a safe rule in all sickness to take early care of all discharges of any kind, to receive them into vessels containing a sure disinfectant, or

to at once add it thereto until such time as the discharges can be disposed of. Spittoons and all vessels should be thus cared for. Either one ounce of sulphate of zinc (white vitriol,) or one ounce of sulphate of copper (blue vitriol,) or one half pound of sulphate of iron (green vitriol,) or one ounce of chloride of lime may be put to a quart of water, and either of these used in a quantity about equal to the discharges they are to neutralize.

One half of a fluid ounce of chloride of zinc (butter of zinc, Burnett's solution,) in a quart of water is of similar service. All discharges should be disposed of within a few hours. They should not be thrown in exposed places or in a water closet in common use, if the sickness is of any infectious character. When buried in earth large quantities should not be put in one place, nor the burial be too deep, since the design is to place them where oxidation by the air can take place without too rapid escape of odor, and yet not be so entirely suspended as to collect a mass for future rapid change. If much in quantity any of these disinfecting liquids may be poured on the ground above them or dry absorbents be used. Next in importance is

THE DISINFECTION OF CLOTHING.

As to the bedding and linen used, and the garments worn, by reason of closeness of contact there is often saturation with unhealthy air or secretions. The best disinfection of clothing is by dry heat. In some cities and in many hospitals, hot air chambers have been erected in which infected clothing is hung or spread, and subjected to a heat of about 250° Fah. In Dublin there is a furnace of this kind for refreshing the woolen or outside clothing of the working classes, which, from being long worn without washing, often becomes greatly soiled. We have already referred to similar fumigation by sulphur at less heat. Some good is accomplished if clothing is kept for some time in a hot oven, and so subjected to dry heat, or hung up in smoke houses over a tar or wood fire. When soiled clothing is placed in water, by the soaking, any particles are rendered less transportable and if covered with the water the exclusion from the air is something. But this is not a process destructive of the particles. Such clothing should be boiled before washing. Thus

the heat of water or steam serves much the same purpose as dry heat.

Sometimes it is not convenient to use these means at once. In such cases it is best to place the garments in water to which some disinfectant has been added. Often, too, it is well to add some of these to the water in which the clothes are to be boiled. The Board of Health, of New York City, has recommended that clothing, until ready for boiling or washing, be immersed in water to which there has been added two ounces of sulphate of zinc, or one ounce of carbolic acid to each gallon of water; or a half-pound of sulphate of zinc, alone, may be used to three gallons of water. It will not stain or discolor fabrics. One ounce of chloride of lead, dissolved in a pint of hot water, and then a pailful of water added, into which a handful of common salt has been thrown, serves a similar purpose.

Permanganate of potash, the colored crystals already alluded to, is valuable as a disinfectant of clothing. Condy's Fluid, so well known as a disinfectant, is a mixture of permanganate of potash and soda, although varying often in the proportion of the different permanganates. The permanganate may be used in the proportion of a dram to a quart of water. It has this advantage that, by the color, you can nearly test whether the organic or soiling material contained in the garments you are soaking is neutralized. The solution is to be repeatedly added to the water, with short intervals, so long as it becomes colorless by standing. When a slight discoloration of the water is maintained we know that enough has been used. The clothing may be boiled in the fluid. Parkes recommends two ounces of commercial chloride of lime, one ounce of sulphate of zinc (white vitriol), or one-half of a fluid ounce of chloride of zinc (butter of zinc) to be added to each gallon of the boiling water in which the garments are thrown. As some of these articles are poisons when taken into the stomach, although from their taste not apt to be touched, they should be kept from the reach of children.

The chlorinated soda solution before spoken of is also excellent as an addition to water for purifying clothing. A half pint of Squibb's carbolic acid solution, for common use, added to three gallons of water will do where the odor, which is dissipated in drying, is not objected to.

When any carbolic acid solution is used alone for soaking or n washing clothing it must not be stronger than one part of the luid acid to sixty parts of water, and as much of vinegar as of he acid should be added that drops of the oil may not injure lothing. The clothing should also be rinsed out in water hav- ng washing soda in it. With these precautions it may be used. Articles that cannot be washed and have been well beaten or haken and aired, may, in some malignant diseases, be still fur- her freshened by sprinkling upon them the sulphate of zinc olution.

DISINFECTION OF HOUSEHOLD ACCUMULATIONS OUTSIDE OF THE HOUSE.

For these the general rule is somewhere outside to have an pening between the sewer and the house by which fresh air can ain access. This opening should not be too near the building, r at least should be so constructed that disinfectants, if necessary, hould be so used that any unpleasant odor is quickly neu- ralized.

Sulphate of iron (copperas) in the proportion of one pound to gallon of water is among the most valuable and available isinfectants. It may be poured into pans or closets to the mount of a pint twice a day at the cost of one cent, or prinkled over masses of decomposing matter or filth-sodden round, until it oxidizes all that might escape to the detriment f health. As the carbolic acid is of some service and the out of oor odor not afflictive, a pint of the crude acid of Squibbs tirred into ten gallons of water with the copperas increases its lisinfecting properties.

When masses of offal or compost have to be overhauled or emoved, the mingling of dry earth, lime, plaster, charcoal or shes, takes up or neutralizes many of the gases of decay and so ounteracts odor and adds to the fertilizing value of the mass.

While it is not always certain that secretions or masses of matter not unpleasant to the senses, are harmless, it is never- eless true that the nose is a licensed detective, and that re- ated use of a disinfectant without odor of its own, until the Pleasant odor of the mass ceases, is an available and reliable de in most cases.

What is known as Sirel's Compound is easily and very cheaply made and of much service. This is it:

Sulphate of iron (copperas) 40 lbs.

Sulphate of lime (gypsum or plaster of Paris) 50 lbs.

Sulphate of zinc (white vitriol) 7 lbs.

Powdered bone charcoal, 2 lbs. (If common charcoal, 6 lbs.)

It may be scattered over or into decomposing matter or slightly wet and made into balls and so kept ready for use or stirred in water in the proportion of a pound to a gallon of water.

What is known as the "lime and salt mixture," is not only valuable, agriculturally, as an addition to composts but has valuable disinfectant and deodorent properties. It is prepared by adding one bushel of salt to three bushels of fresh slaked lime, and frequently stirring the mixture under cover until it absorbs sufficient moisture to be slightly adherent when dry earth may be mixed with it to a small amount, and the whole scattered when needed.

Another mode of preparing it is to pour a saturated solution of salt water upon unslaked lime in the proportion of one bushel of salt to three of lime. Stir it every day for a week under cover. In this process the chlorine of the salt unites with the lime, and a chloride of lime is formed. This is a ready and valuable mode of preparation. The compound may be freely scattered in cellars or about outbuildings. It is inexpensive, and when thrown on heaps of compost has a fertilizing value which pays for it.

There are other articles which act as disinfectants, but the list already given affords sufficient variety and presents those which are cheapest and most efficient. There is little need to resort to any of the patented preparations since the real efficiency of these is not easily tested.

A good disinfectant either has in it oxygen, which it readily gives up to organic matter undergoing decomposition, and so renders it harmless, as do the various metallic substances we have named, or like charcoal, dry earth, etc., can act as an absorbent of the gases of decay, or like lime, while hastening the processes of decomposition, when in immediate contact, also breaks up ammoniacal products, or disposes of them. As some of these

rticles act doubly we cannot accurately classify them, but thus ssociate them as in one way or another dealing with decomposi- ion and its products, so as to render them less perilous to health. 'rom the variety given anyone, either for home or public use, nay easily select a good disinfectant. Chlorine, carbolic acid nd the permanganate salts, if used together, interfere with each ther. As to several of the articles we have named there are lifferences of preference which are more those of taste and habit han difference in their value. We believe that with the proper se of air, water and cleanliness, and resort to these when indi- ated, very much sickness can be prevented, and the risk from nfectious diseases and bad air greatly diminished.

Herewith, for permanency of reference, we append the circu- ar which the Board of Health issued last July, on the care and lisinfection of houses, cities, &c., as embodying the principal acts and directions needed for guidance in the use of the various rticles we have considered.

CIRCULAR

OF

NEW JERSEY STATE BOARD OF HEALTH

TO HOUSEHOLDERS, CITY AUTHORITIES, BOARDS OF HEALTH, ETC.

I. *Look to the Condition of your House.*—Begin at the cellar or basement. Have nothing there that can decay, or that causes foul odors. If damp, let in air or sunlight, or drain the surroundings if needed. If by cleansing, by whitewash or by repeated airing there is not agreeable air, speedily use some of the disinfectants recommended.

II. *Look to the Kitchen.*—Let all sinks be kept sweet by scrubbing—by hot water poured down each day, or by use of disinfectants if needed. If outside there is an opening to the air, so that the kitchen sink is not the chief air outlet to a cesspool or sewer, so much the better. Be careful that all slops or offaling from the kitchen or laundry work is soon conveyed away, or disinfected at once, and not made to become a part of any heap or mass of impure matter. Cleanness cannot come out of uncleanness. Such things rapidly vitiate air, and discomfort, sickness or death result. Dirty water of any kind is even worse than dry filth. Secure cleanliness if you would secure health.

III. *Have the Dwelling and Sleeping Rooms well aired each day.*—Closed closets, unshaken bed clothing, windows open and curtains down, will not secure rooms fit to live in, or sleep in. *Flush* the room with air and let this, with sweeping and dusting, remove the organic particles which otherwise constantly accumulate and cause foulness. Chamber slops and wash water are very innocent if cared for within six hours, but soon after decompose, and in sickness or very hot weather, sometimes sooner. If there are water closets or stationary wash basins in your house, be sure

that they are not the foul air inlets to outside cesspools or sewers. Have good traps, good outside ventilation, good caution as to smells and use disinfectants for temporary purposes until you can remedy radical defects. Look to unoccupied rooms and the attic so that all may be dried and well aired, and that you may secure as much coolness and ventilation above you as possible, and not have an unventilated hot air chamber near the roof.

IV. *Know as far as you can that your Water and Ice Supply is Pure.*—Use no water from wells where surface soil is foul or where organic matter can reach, or from cisterns exposed to foul air, as water will absorb foulness. If the water has any odor while heating in a glass tube, or if it becomes turbid or emits odor on being shaken after being kept a day in a long glass bottle, half full and corked, at once suspect it. If you must use it, have it boiled, and when cool, air it by pouring from one pitcher to another, and use it thus until you can be satisfied as to the purity.—See in full our First Annual Report, pages 83–4.

V. *See that the Food Supplied for your Family* is in proper condition before cooking, and that it is prepared in a wholesome way.

VI. *Look to the Out Door Part of your Home and see that it is kept in Proper Order—that no waste water or decomposing matters are thrown upon it.*

If there is a cesspool it must not smell where it is disconnected with the house or has access to the air. If it does, it must be disinfected until radical change can be made. If there is an ordinary out door privy have free access of air to it, and exclusion of all slop or rain water from it. If there is odor from it use odorless disinfectants until it is corrected. If too foul for use cover it over with "calx powder," and have under the seats some receptacle, such as the patent pail, or a half barrel or tub, which can be frequently removed and alternately replaced by another. A privy built above ground, with water-tight receptacle, by the use of dry earth, powdered wood charcoal, dry sifted ashes and occasional copperas water, is easily kept neat and clean, if cleansed each spring and fall.

Country homes need inspection and circumspection. Their sanitary care is often greatly neglected by nice people.

VII. *Insist that your town, if you live in one, have thorough sanitary inspection.* Where persons are housed closely to each other there cannot but be evils from which the community has a right to be protected, and yet from which each one cannot protect himself. There will be householders who, from thoughtlessness, ignorance or poverty, do not secure for themselves or for others the needed sanitary conditions. Charity, the public welfare, and the necessary incidents of city life require regulated and definite provisions against all those nuisances which imperil the life and health of the populace.

Insist upon systematic prevention, instead of waiting for that loss which disease always involves when it is artificial or when we are compelled to meet an epidemic hurriedly.

If your authorities do not act, move by voluntary associations, which shall exhibit the facts and so compel action.

There is no waste so great as that of preventible disease, which disables not only the sufferers, but puts a tax on labor, capital and life much more direful than a well directed expenditure to prevent it. Epidemics are to be dreaded, but our greatest losses are from a chronic death and sickness rate which has a permanent base of supply in prevalent unsanitary conditions, not prevented, not remedied as they should be and can be. Public health is common wealth. Can you not do something to reduce the tax levy which forced diseases impose upon the citizens of your city, township and State? To the degree that sickness or invalidism is unnecessary, it means hard times and ill-content. Every motive of comfort and interest requires that we plan to prevent all those ailments which are within the range and duty of our control.

DISINFECTANTS, AND HOW TO USE THEM.

Drafts of air for all floating foulness;

Dry rubbing for all easily detached foulness;

Wiping and water scrubbing for all attached foulness in most cases admit of no effective substitution.

Submersion in boiling water is applicable to the cleansing of all garments, utensils, &c., admitting of such a method; and dry boiling heat or freezing cold will also neutralize infective particles.

To disinfect a room, ship or building so needing disinfection that its contents and surfaces cannot be easily dealt with singly: Close the room or building, its windows, doors and chimneys so as to exclude the outer air as far as possible. Vacate the house. Break roll sulphur in small pieces, place it in each room on an iron plate or metallic dish, and set this on a pair of tongs or other cross bar over an iron pot in which there is water, or over a large box of sand, so as to avoid danger of fire from small particles of burning sulphur. Light it by a few hot coals or some alcohol poured around the sulphur and lighted. Then leave and shut the door after you. A pound and a half of sulphur is sufficient for 1,000 cubic feet of space. The sulphur will convert all the oxygen of the air into sulphurous acid, and all organic particles are likely to be changed. Keep closed six hours after the burning has ceased, and then air well four hours before occupying. Clothing and bedding needing disinfection may be hung on lines and left in the room. Most furniture is not permanently injured, but needs dry wiping and then washing off afterward.

CHLORIDE OF LIME.

A valuable disinfectant, chiefly because it contains from thirty to thirty-five per cent. of chloride, which is liberated under proper methods of use. If purchased for cities, it should be tested as to the amount. It is not overrated as a disinfectant if only its quality is known and its mode of use is judicious.

It needs slight moistening, frequent stirring, and sometimes the addition of an acid, as vinegar or common spirits of salt. The test of its efficiency is that the odor of it be kept constantly perceptible.

CHLORINATED SODA.

Usually known as Labarraque's solution, is a convenient liquid preparation valuable for use in saucers in the sick room or in utensils. Its odor should be perceptible to strangers entering. Directions are given on the bottle.

LIME—PLASTER—CHARCOAL—DRY EARTH—SIFTED ASHES.

All these have value, chiefly to be tested by the rapidity with which they correct odors. Fresh slaked lime should be scattered

in all places of foul odor. It or charcoal or plaster may be scattered over heaps emitting foul odors. Calx powder is made by pounding one bushel of dry fresh charcoal and two bushels of stone lime and mixing them, and is of great practical use.

All these substances absorb foul gases and dry up moisture, and so help to retard decomposition, or else absorb its results. Where lump charcoal is used it may be refitted for use by reheating it

Quick lime and ground plaster should not be used where they may be washed into pipes and form lime soap or obstruct by hardening.

THE METALLIC DISINFECTANTS.

Sulphate of iron (copperas or green vitriol), two pounds to a gallon of water, to be sprinkled freely in drains, cess pools, privy closets, soiled vessels or on heaps of decaying matter, which cannot be removed at once. One-half of the strength will do where it is to stand in contact with surfaces or in spittoons, water closets, house-vessels or vaults.

One-half pound of sulphate of iron (green vitriol), or one ounce of sulphate of zinc (white vitriol), or one ounce of sulphate of copper (blue vitriol), or one ounce of chloride of zinc (butter of zinc), or one ounce of chloride of lime (bleaching powder), put to a quart of water—any one of these is available for neutralizing discharges or for sinks, used in quantities sufficient to cover the bulk they are intended to disinfect.

Soiled garments may be put to soak in a half pound of sulphate of zinc (white vitriol), to three gallons of water. It will not stain or discolor most fabrics. One ounce of chloride of lead dissolved in a pint of hot water and then a pailful of water added into which a handful of common salt has been thrown, serves a similar purpose. Also a half ounce of permanganate of potash to a gallon of water.

For washing, soiled garments should be put in boiling water, unless the character of the fabric forbids it. Powdered borax one quarter of a pound to a gallon of water, is a good cleanser of clothing. Soiled hair, brushes, etc., are cleansed by it. Chloride of zinc, one quarter of a pound to a gallon of water, does not stain or discolor fabrics.

To disinfect a room, ship or building so needing disinfection that its contents and surfaces cannot be easily dealt with singly: Close the room or building, its windows, doors and chimneys so as to exclude the outer air as far as possible. Vacate the house. Break roll sulphur in small pieces, place it in each room on an iron plate or metallic dish, and set this on a pair of tongs or other cross bar over an iron pot in which there is water, or over a large box of sand, so as to avoid danger of fire from small particles of burning sulphur. Light it by a few hot coals or some alcohol poured around the sulphur and lighted. Then leave and shut the door after you. A pound and a half of sulphur is sufficient for 1,000 cubic feet of space. The sulphur will convert all the oxygen of the air into sulphurous acid, and all organic particles are likely to be changed. Keep closed six hours after the burning has ceased, and then air well four hours before occupying. Clothing and bedding needing disinfection may be hung on lines and left in the room. Most furniture is not permanently injured, but needs dry wiping and then washing off afterward.

CHLORIDE OF LIME.

A valuable disinfectant, chiefly because it contains from thirty to thirty-five per cent. of chloride, which is liberated under proper methods of use. If purchased for cities, it should be tested as to the amount. It is not overrated as a disinfectant if only its quality is known and its mode of use is judicious.

It needs slight moistening, frequent stirring, and sometimes the addition of an acid, as vinegar or common spirits of salt. The test of its efficiency is that the odor of it be kept constantly perceptible.

CHLORINATED SODA.

Usually known as Labarraque's solution, is a convenient liquid preparation valuable for use in saucers in the sick room or in utensils. Its odor should be perceptible to strangers entering. Directions are given on the bottle.

LIME—PLASTER—CHARCOAL—DRY EARTH—SIFTED ASHES.

All these have value, chiefly to be tested by the rapidity with which they correct odors. Fresh slaked lime should be scattered

in all places of foul odor. It or charcoal or plaster may be scattered over heaps emitting foul odors. Calx powder is made by pounding one bushel of dry fresh charcoal and two bushels of stone lime and mixing them, and is of great practical use.

All these substances absorb foul gases and dry up moisture, and so help to retard decomposition, or else absorb its results. Where lump charcoal is used it may be refitted for use by reheating it

Quick lime and ground plaster should not be used where they may be washed into pipes and form lime soap or obstruct by hardening.

THE METALLIC DISINFECTANTS.

Sulphate of iron (copperas or green vitriol), two pounds to a gallon of water, to be sprinkled freely in drains, cess pools, privy closets, soiled vessels or on heaps of decaying matter, which cannot be removed at once. One-half of the strength will do where it is to stand in contact with surfaces or in spittoons, water closets, house-vessels or vaults.

One-half pound of sulphate of iron (green vitriol), or one ounce of sulphate of zinc (white vitriol), or one ounce of sulphate of copper (blue vitriol), or one ounce of chloride of zinc (butter of zinc), or one ounce of chloride of lime (bleaching powder), put to a quart of water—any one of these is available for neutralizing discharges or for sinks, used in quantities sufficient to cover the bulk they are intended to disinfect.

Soiled garments may be put to soak in a half pound of sulphate of zinc (white vitriol), to three gallons of water. It will not stain or discolor most fabrics. One ounce of chloride of lead dissolved in a pint of hot water and then a pailful of water added into which a handful of common salt has been thrown, serves a similar purpose. Also a half ounce of permanganate of potash to a gallon of water.

For washing, soiled garments should be put in boiling water, unless the character of the fabric forbids it. Powdered borax one quarter of a pound to a gallon of water, is a good cleanser of clothing. Soiled hair, brushes, etc., are cleansed by it. Chloride of zinc, one quarter of a pound to a gallon of water, does not stain or discolor fabrics.

Parkes recommends two ounces of chloride of lime, or one ounce of sulphate of zinc, or one-half of a fluid ounce of chloride of zinc, to be added to each gallon of the boiling water in which the garments are thrown. On clothing that cannot be washed and does not need to be burned, after thorough shaking and airing the sulphate of zinc or chloride of zinc solution may be sprinkled.

For general disinfection the following compound is available and valuable, and far better than most of the patented articles offered:

Sulphate of iron (copperas), forty pounds.
Sulphate of lime (gypsum or plaster), fifty pounds.
Sulphate of zinc (white vitriol), seven pounds.
Powdered charcoal, two pounds. (If common charcoal, six pounds.)

Mix well and scatter dry or wet it in small quantities and make into balls ready for use. Where liquid is needed, stir in water in the proportion of a pound of the powder or ball to a gallon of water, and sprinkle where needed.

Carbolic Acid is valuable as an out-door disinfectant, to be added to the sulphate of iron solution or used separately. Because of its own odor we cannot well test its effect in correcting other smells. We would test specimens or use only Squibb's Liquid, No. 1, because sure of its strength to be diluted by adding from fifty to one hundred parts of water, according to the mode of its employment. It is seldom required if the other articles named are properly used. Carbolic acid and chloride of lime must not be used together.

Remember that we do not know that any chemical disinfectants destroy the germs of a disease.

They only neutralize or suspend the action of those artificial disease producers or fertilizers which the bad administration of cities or householders, or interference with natural laws or neglect of cleanliness has provided. We are to rely on these palliatives or correctives only while we are preparing for radical methods of prevention.

N. B.—The only reason why the death rate of your city or your township is over 15 to the 1000, or why the sickness and

ıvalid rate is a large multiple of this, is because you are the ictims of nuisances which admit of abatement.

PRESENT WHOLESALE PRICES OF DISINFECTANTS.

Sulphate of Iron (copperas, Green Vitriol), 1½ cents per pound.
Sulphate of Copper (Blue Vitriol), 6 cents per pound.
Sulphate of Zinc (White Vitriol), 4½ cents.
Chloride of Lime (in bulk), 2 cents per pound; in packages cents.
Sulphur Roll, 2½ cents per pound.
Carbolic Acid (No. 1 Squibbs), 30 cents per pound.
Zinc and Carbolic Acid, disinfectant of N. Y. Board of Health 0 cents per gallon.
Permanganate Crystals, $1.10 per pound.
50 per cent. solution Chloride of Zinc, 25 cents per pound.
Solution of Chlorinated Soda (Labarraque's), 10 cents a pound.

ETEOROLOGY AS AN AID TO THE PHYSICIAN.

BY PROF. C. F. BRACKETT.

There can be no doubt as to the value of a system of knowl-
ge which should enable us to forecast the weather for a consid-
able time. The gain to those pursuing agriculture and other
dustries on land would be incalculable, while the safety of the
ariner would practically be measured by his intelligence and
re.

The very maintenance of life itself is in the nature of a con-
st, to which the ever-changing processes of nature, which
nstitute what we call climate on the one hand, and the more
rcumscribed, but not less complex, activities of the organism
ı the other, are parties. The successful issue of such a contest
ıust turn on the skill with which it is conducted. It may be
adily admitted that there is a vast amount of experience in the
ıce which has not been formulated in language—which, indeed,
o words could embody—common alike to men and animals,
hich enables a goodly number to win; and yet, it must be con-
ssed that the failure of the vast hosts that fall out by the way,
a subject for very serious study.

Life having to do with surroundings whose elements are, in
eneral, earth, water and air, it must be greatly to our advantage
e able, from the past and present, to infer the future. And
ıe value of such ability is to the mariner greater, when ex-
d to greater dangers from scantiness of food or fuel, so to the
ılid it increases in importance when the necessity of extreme
and economy are upon him in respect to health.

he physician, as his guide, should be able to offer him all the
attainable in anticipating and accommodating himself to
external conditions as they may arise, as well as to prescribe
per diet and medicines. In short, no treatment can be
onal and judicious which ignores climate and climatic

changes. No doubt the great father of medicine wrote more wisely than even he knew when he said, "Whoever wishes to investigate medicine properly should proceed thus: In the first place to consider the seasons of the year and what effect each of them produces. * * * Then the winds, the hot and the cold, especially, such as are common to all countries; and then such as are peculiar to each locality." Then, after speaking of water and surface features, he goes on to say, "From these things he must proceed to investigate everything else. For if one knows all these things well, or, at least, most of them, he cannot miss knowing, when he comes into a strange city, either the diseases peculiar to the place, or the particular nature of common diseases, * * * and, if it should be thought that these things belong rather to meteorology, it will be admitted, on second thoughts, that astronomy (used for meteorology) conduces not a little, but a very great deal, indeed, to medicine."

If such views prevailed in the days of Hippocrates, they are with reason even more important now, when the real significance of physical phenomena may be ascertained with far greater certainty than was possible in his time.

If it be the proper business of the physician to conduct his fellow-man in the ways of health, as well as to bring him back when once he has lost them, he, surely, must not be wandering in doubt himself. He must know man not merely as a machine, but must rightly apprehend the relations existing between all that goes to make up man and his surroundings. He can be content with nothing less if he would vindicate his claim to his somewhat exalted title.

In respect to soils and waters the attainment of such knowledge is not so inherently difficult, for they may be taken, and, by proper analysis, be made to disclose their sources and their injurious elements, and so they may be avoided, while it still remains true that "the wind bloweth where it listeth."

It is the object of this paper to point out some of the difficulties pertaining to the study of meteorology, as well as some of the results already attained, having specially in view the bearing of the whole on the proper work of the medical practitioner.

Meteorology properly embraces the study of atmospheric phenomena resulting in connection with the physical properties and configurations of the earth in what we call climate and weather.

The atmosphere presents a pretty uniform mixture of elementary and compound gases and vapors, whose proportions are, on the whole, very constant, and are known with considerable accuracy. Many careful analyses have shown that nitrogen constitutes about 79.2 and oxygen about 20.8 parts of its volume. In addition, other constituents are vapor of water in variable proportions—carbonic dioxide, ammonia, ozone, compounds of nitrogen and oxygen—organic matters due to decomposition, traces of volatile matters derived from many solid substances.

It may, perhaps, aid us in our task if we imagine the atmosphere free from storms and winds, so as to be quite at rest, so far as can be observed by its mechanical effects, and at the same time the earth to present no irregularities of surface. There would still remain the weight of the atmosphere, to which every being on the earth must be subject. If the air were of uniform density throughout, its height would be about five miles. If it were compressed so as to be as dense as water, its height would be about thirty-three feet. If it were further compressed, till its density equalled that of mercury, it would be only about thirty inches. We should best realize the weight of the atmosphere, perhaps, by computing that of an ocean of mercury enclosing the earth, thirty inches in depth.

Under the conditions supposed there would be no respite from the steady, unvarying pressure which we may well believe would speedily bring all life, as we now know it, to an end. But suppose it otherwise, and that life could exist and prosper, would it be true that the air would be completely inactive?

The dynamical theory of gases now doubtless satisfactorily established, affirms that every individual molecule of gas is in a state of most violent and unceasing activity, the mean velocity of the molecule being in the case of oxygen, about one-quarter of a mile in a second; that of nitrogen being somewhat greater. In consequence of this activity, it is clear that we might expect great uniformity of mixture in the atmosphere, even if the mass of it were apparently at rest.

Let, now, the earth's surface assume its present configuration. Plainly some variety in respect to pressure might be secured by choice of residence, those in the valleys having the greater, and those on the heights the less.

The practitioner, in such a world, would, no doubt, wisely send his patient dwelling in the lowlands, suffering from pulmonary insufficiency, up among the mountains, and so apply his knowledge of the laws of fluid pressure to effect a cure.

Under the conditions supposed it is clear that our chief reliance for an unvitiated atmosphere must be on the diffusive action of its constituent gases, resulting from their great activities. Slow oxidation, no doubt, would proceed as now, only much more slowly. In short, we should have on a grand scale the same conditions as prevail at present wherever the air is restricted in its circulation, whether from natural or artificial causes, at least so far as the question of purification is concerned.

Let us now consider some of the causes, external to the earth, which are continually acting so as to render the state of things just supposed, impossible, by setting up movements of most tremendous energy and extent. The principal of these is the sun, our great source of heat and light.

If we have recourse to our former suppositions, imagining the earth free from all irregularities of surface, it might, perhaps, seem possible, from what we know of the laws governing the motions of solids and fluids, to calculate, from data which observation might secure, the principal phenomena which would present, day by day, and thus we might be able to predict those changes in the weather which it so much concerns us to know, provided we might assume the sun to be constant in his action.

But we know that his action is not constant, hence, before we could go on with the solution of our problem, we must investigate the laws of solar activity. We may consider as known all those changes of our earth's position, with respect to the sun which astronomy has pointed out and made familiar. Something, too, is known respecting periods of maximum and minimum activity of the solar surface, but a vast deal remains yet unknown, and we shall require the continued and regular employment of every appliance that can qualitively detect or quantitatively measure the intensity not only of activities which are now known to exist, but also of those which further inquiry is sure to disclose. The camera has but just commenced its important work, it would seem, for new processes in photography are just coming forward of sensitiveness heretofore un-

gined, while it is still true that the older and well-known
ıods have never been worked to any extent proportionate to
r capabilities. The spectroscope, the heliometer, the magnet
the telescope even have much more to say than they have
:ed thus far, while new and undreamed-of instruments will
eeded in the immediate future to prosecute inquiries already
ıosed.

ut even if we had catalogued and measured the solar activi-
in all their varying intensities, there would still remain the
ıd integrals of stellar influences which we might not neglect,
ıgh placed so far remote.

ıppose all these studies completed. We should thus know
agents which, acting in conjunction with terrestrial condi-
s, produce those effects which constitute the climates we
ld know and the weather we would foresee.

et us now enumerate some of the factors entering into the
ɔlem which result from the configuration of the earth's sur-
. These are the complex continental and oceanic outlines,
interspersion of islands in the seas and of lakes in the lands;
disposing of mountain chains to interrupt or change the
:ction of wind and to condense the moisture they bear; the
rses of the valleys determining those of the rivers; similar
ures of the ocean bed determining the extent and direction
ɔcean currents; the character of the soil in respect to radia-
ı and absorption of heat; the nature and extent of vegeta-
ı, etc.

low, after fixing the exact boundaries and relations of all
ɜe features, we might suppose ourselves ready to proceed; but
ɜhould find that, meantime, the whole had been undergoing
nges such as vitiate our record, even supposing that its
ginal complexity did not defy our utmost resources of ex-
ɜsion.

f it were otherwise, and we had at last come to the final effort
leducing the future from the present and past, we should
e now no problem in statics, but, instead, an exceedingly
.cult one in dynamics. We must study a tremendous engine
.ction, in which the regular cycles of our theoretical engines
absent, or at least not readily apparent. From every stroke
·e results a new condition, making it difficult to say what the
t shall be. It would seem, in view of what has now been

presented, that the time for the deductive treatment of weather problems has not yet arrived.

Let us now see how the case stands, viewed from another point:

All the world knows that in spite of the discouraging picture above presented, weather-charts and storm-warnings, often of surprising accuracy, are sent out from governmental centres at home and abroad, and are in daily use in arranging plans for business or pleasure by thousands.

The telegraph, as a means of rapidly collecting facts respecting atmospheric conditions from widely distant points, has rendered this possible. A country of great extent like ours is evidently favorable to success in such an undertaking, yet we are very far from having realized all that is possible.

The discussion of data daily collected and the comparison of the results with the subsequent history of storms have overthrown many views that were formerly believed to be too obvious to admit of doubt, and have established some generalizations that were recently in doubt.

On the whole, however, there is progress which we may expect to be more rapid in the future, since now hardly a civilized people exists that does not recognize the immense importance of such studies and contribute to further them by an active co-operation.

When once the whole earth is encircled by telegraph lines by which observers stationed at important points all about it, shall report the facts they observe at the same physical instant, it will, perhaps, be easy to say not merely twenty-four hours in advance, but several days, what and how violent changes in the weather may next be expected.

Such results would approach very closely to a solution of our problem; but the process employed, let it be noted, is entirely different from that which we at first supposed to be employed.

It must still remain true, after all is done that may be to forecast the weather, that only general laws which govern movements of great extent can be detected.

The habits of local showers and the domestic fog-bank must be studied by the prophet of every neighborhood which presents any peculiarity of feature or position, as must also the higher clouds and prevailing winds, and, indeed, everything that can in

any way contribute to the end in view. Instrumental observations carefully and continuously made, may, in connection with the daily bulletins issued by the Signal Service, lead to previsions that shall seldom fail to be of substantial accuracy. But here let us insist that to be of real value, observations *must* be made in a continuous manner almost from hour to hour, whether we record the changes apparent in our instruments, or those going on the effects of which are visible in the clouds.

Respecting the proper choice of instruments and installing them in their places, it is not needful that anything here be said, since whatever is done should be so done as to conform to the uniform practice of those having the direction of an extensive service in charge, in order to uniformity of results under like conditions.

No one will wisely reject, without examination, the weather wisdom professed by those who lay no claim to scientific training, but whose acute observation and native shrewdness have enabled them to put their results into short pithy sayings, often apparently absurd, but still frequently verified. "In summer the showers follow the rivers," may serve for an example. The explanation is not far to seek. Many maxims of a similar character may be gathered in every region that has been long inhabited, and it is a curious and profitable study to unravel the reasons for many of them, as well as to show the unreliable character of others. It would be found that the unobserving stranger, who migrates to a new locality, brings the opinions respecting the weather, as well as respecting everything else, that prevailed in his former home, but which may not be at all applicable in the now changed conditions; hence, a vast amount of nonsense is everywhere to be found.

It would be quite superfluous to point out in detail the bearing of accurate weather provisions on the public health, for the advantages of such knowledge is so obvious that practitioners and patients alike have long desired it.

Indeed, the whole catalogue of means at the disposal of the physician may be arranged under the heads of circumfusa, ingesta and medicamenta, of which the last is by far of least importance. It would not always be the part of wisdom for an invalid to journey far and endure the consequent fatigue when he failed to take proper advantage of the climate at home. This

can be more certainly done, the more completely the character of the climate is studied.

The physician, then, should study the climate and the weather of the place in which he is to practice his art, as completely and as persistently as he studies the cases of his patients. Indeed they are not to be separated, for a sudden change that a day may bring, not unfrequently decides a case by closing it against all further inquiry.

If the attention of physicians could be drawn to this subject in such a manner that they should not only make it a matter of careful and constant study, but as a fraternity of learned men, should insist that a good knowledge of it should be required of all who seek admission to their ranks, we should have reason to hope for most excellent results in the immediate future. A careful training in the principles of chemistry is considered essential to the discipline and preparation of a physician, and rightly, but it must be admitted that such a knowledge of physics as shall enable him to observe properly the changes going on in the atmosphere, and to conduct researches likely to enable him to turn them to good account, is not less important.

Let all who would possess themselves of even the knowledge that is now to be secured, dismiss every hope that it is to be found by any such course of inquiry as that which we have shown, must, in the nature of the case, present insuperable difficulties. The only hopeful method is that which puts under contribution facts collected from the widest areas as well as those of merely local importance—and judiciously applies the best methods of discussion and interpretation.

Fortunately, there are now many helps to which one may refer with confidence.

PRINCETON, December, 1879.

LETTER

'RESENTED TO THE LEGISLATIVE COMMISSION ON THE GOVERNMENT OF TOWNS BY THE STATE BOARD OF HEALTH.

On behalf of the State Board of Health, by your kind invitaion we beg to present to the honorable Commission on the Govrnment of Towns a few suggestions as to the sanitary adminisration of municipalities, and how far this should come under he regulation of general or State law.

We do not at present need to discuss in extenso the importance f recognizing sanitary enactments as a vital and integral equisite for each State. You will recall that even the common aw of Blackstone's period speaks of the "fourth species of ffences more especially affecting the commonwealth, as such as re against the public health of the nation." "A concern," says e, "of the highest importance, for the preservation of which here are in many counties special magistrates or curators ppointed."

While every county of the State is subject to some insanitary nfluences which need surveillance and abatement, experience as shown that it is in cities especially that we are apt to find hat aggregation of evils which largely tells upon the health and ife of the population. Statistics carefully tabulated have fully ustified the statement of the Registrar-General of England that 'human life is shorter by almost one-half in cities than in the ountry, so that with much truth great cities have been called he graves of mankind." This is really but a way of illustrating hat disease and death in practical experience are largely rtificial. In a general and casual knowledge of sickness and death, without comparative statements, we are not made aware how much the conditions of life are affected by this aggregation.

The death rate per thousand of living people fluctuates from thirteen to forty, fifty or sixty per one thousand in different places, the fluctuations being very largely chargeable to the local, the domestic, and the associate conditions of population. Large numbers of comparisons, extended through many years, have shown how uniformly the larger rates attach to cities, and especially to those in which there is no effective sanitary oversight.

Similar tabulations have also shown conclusively how in most cities a higher death rate than in the country is uniformly maintained, without the agency of special epidemics, and how this can be uniformly reduced by the intervention of sanitary enactment and enforcement.

In the thirty-eighth annual report (1875) of the vital statistics of England and Wales, may be found tables showing the annual rate of mortality per one thousand in town and country districts in the twenty-nine previous years. The contrast is most significant as to the tendency of cities to multiply disease far beyond the natural average. In the thirty-seventh report comparisons are made of thirteen districts as showing what sanitary administration can accomplish for massed populations. The result is thousands of saved lives, which it is also to be remembered represents still more advantage in the saved health and diminished sickness for the living which such figures always indicate.

It were well if statesmen and civilians would come more fully to realize the dependency of effective citizenship and State development upon a provident care of the public health. It is deceptive to talk of our *material resources* and forget that there is no resource so powerful or the case of which is so urgent as that of population. The time too has come when we need to deal more with the causes of enfeeblement, degradation and loss, and not so much confine our Legislation to compensation for consequences.

As dwellers in cities are so much more largely exposed to insanitary conditions New Jersey has especial need for wise foresight. Not only does modern civilization incline to mass the population in cities, but the peculiar relations of our State to adjacent cities and to tide water will ever incline our people to aggregation in great centres. Our fifty cities already represent in a very small comparative area the majority of our citizens. They must be studied as to the conditions of progress.

rotection from avoidable causes of sickness and death means rovision for prosperity as much as do care and direction of ır industries.

The rapid growth of towns, the influx of immigration, the ısanitary condition always incident to the arrival of those of aried nationalities into close vicinage, the introduction of ıachinery and the consequent increase of close in-door labor in) many departments of industry, the modern system of ı-dwelling conveniences, and various other potent and conrmed artificialties, compel us to guard more than did our .thers, against associate evils, and to remedy consequences al-ady cumulative and apparent.

Sanitary provision as a law of compensation is so far emanded, that, *if not* made, a lowering of natural vigor, a .rger aggregate of sickness and untimely death are the inevit-ɔle results.

Modern sanitary knowledge has become so much more definite ıd exact, both as a science and an administrative art, that it ɔes not hesitate to point out evils with precision, and to indi-ıte confirmed methods of limitation or abatement. Students of ıe conditions of physical life and those who are now, by thou-ınds, engaged in the active practical application of sanitary nowledge, are constantly deploring how far short are the actual ıeans used of the methods approved and available. Life, ealth and the welfare of population are within the reach and ıe duty of our control, if only the art of oversight is applied ithin the limits which strictly belong to the material interests such a social compact as the State is.

The sanitarian runs no risk of discomfiture, if he takes his and within the closest limits of social science and political ɔnomy, and pleads for legal jurisdiction solely on such grounds ; pertain to the resources of the State and the social welfare of s citizens. Deliverances from the civic burdens and penalties sickness, shortened life, and from the entailments of poverty, ylums and prisons are largely within such an estimate.

By a fundamental and organic law such an interest as this lls under legislative and judicial advisement to a degree which ɔmmends itself in theory, but yet which in practice has thus far ɔen very inadequate.

In England the most definite early modern movement for sanitary jurisdiction was a direct outcome of social and economical interests. The report of "The Commission on the health of Towns," led to the bill of Lord Morpeth "for improving the health of towns in England," which became a law in 1848. When it was found that in some cities of England the death-rate was continuously over twice as great as in some country localities, and that large towns varied among themselves from twenty-one per thousand to thirty-eight per thousand, it was regarded as not only a local or town interest, but a national interest to look after the causes of such sustained variations in the health condition of localities. Ever since it has been found profitable by the English Government, as it has been by the French, the Swiss, the Swedish and the German, to follow up this method of public care until no department of national concern rests on a surer basis or meets with a more public approval than that of the health service. It is from such considerations that we desire to urge upon this Commission, for the government of towns the interest as one so vital to the whole State as in some leading outlines needing defined State provision. In the conferment of chartered rights, the State should see to it that the welfare of her great municipalities is not compromised and that city governments shall not imperil the welfare of our citizens.

As a result of a close analysis of English statistics and of towns as compared with the country the English report says: "The juxtaposition of the figures in the tables suggests the melancholy reflection that more than seven millions of people inhabiting the metropolis, and all the cities and great centres of industry, are exposed to a mortality which is not inherent in their nature, but is due to the artificial circumstances in which they are placed. The waters, the sewers, the soils, the churchyards, the houses, emit poisons. To every ten natural deaths, four violent deaths i. e. deaths from these poisonous exhalations are superadded." The same kinds of ratio are still occurring, and are to be guarded against by the State in its authorizations of massed communities with vested privileges. We might almost rely upon the admission which this view has received abroad, and quote in detail the uniform and progressive interest which has been manifested, as shown by the degree to which

local legislation has itself sought or approved of general enactments.

But as in our system of government more is left to local authorities than is usual in those of a more consolidated character, we need to determine whether this belongs to the large class of interests which, not less than in other nationalities, should be conceded to belong to the State government.

Even here we may at first urge the large example of Massachusetts and Michigan in their general health enactments, and still more the recent act of the National Government, in which after a debate neither partisan nor sectional, a large majority from different constituencies has been commanded in favor of the recognition of public health, as in prominent respects so much a national concern as not to be left to local jurisdiction, even of States alone. It is thus authenticated as a constitutional principle that the interests of public health are so imminent and vital that the general government must, by general act, see to it that it either exercise its national jurisdiction or require that the same shall be exercised by local authorities.

When we come to deal with the still more intimate and common interests of the citizens of one State, it is still more apparent that closer vicinage and harmony of interests require that the public health should be carefully secured by general enactment in all those regards in which the danger of jeopardy to the bodily and social welfare of our people, is greater than any assumed risk which might arise from hypothetical infringement upon the prerogative of towns by the exercise of the higher authority of the State.

Questions of health and physical welfare are in many points allied to those of education. General and regulative laws must be enacted by the State while the enforcement and the extension to details may rightly be left to each city.

Unless there are some such general enactments, it has been a uniform experience that strange neglects occur. While some corporations are informed and faithful, others, by their laxity, involve not only their own municipality, but their neighbors, in the results of their indifference or ignorance. Where peril from such neglect is so universal and so aggressive in its results to the State, and where from the fact of a want of co-ordination of action in the whole, there is necessary defect in the action of

a part, it behooves the State to exercise its regulative and co-ordinating power. These interests are so vital to all citizens that they cannot be left to smaller communities alone. They are too far-reaching to be disposed of as if they were merely local matters.

The State, in the formation of a municipality, accords to it not a few special privileges, and confines to it large rights of local jurisdiction. In such bestowal of powers it is not too much for the State to reserve to itself the right to secure for its own citizens such over-sight of the health and life as is the equal right of all, or the care of which, in some definite form, must at least be enforced upon the local authorities.

We may not leave such a universal social interest any more than we may leave the principle of education or of law, to be entirely subject to the enactment or oversight of local powers. Often where it is unwise for general law or State authority itself to undertake the administration, it is wise to designate what is due to be enforced by local authorities in a common interest, and to see to it that local power is dispensed in accord therewith.

With these views as thus presented, we beg now to designate particulars in which our Board would respectfully suggest to your honorable commission that there is need on the part of the State of general health requisition for towns.

1. We submit that every incorporation should be required to have a Board of Health, which shall make a written report each year, or as much oftener as any city may direct, and that copies of the annual report shall be sent to the State Board of Health. The interests of each city and of the whole State are so related that no just estimate of localities, of their defects and of the relative healthfulness and peculiar local causes of disease can be fully made unless there is a comparison of one part with another. While the whole area is important, this comparison naturally begins with cities as representing our most exposed population. The State, by its Board of Health, seeks to bring together series of facts and to make such deductions as can only be made by comparisons, and such as have been found greatly to aid local administration. A Board of Health, therefore, not merely nominal, but one which, by its reports, shall show what is being done to protect the health of the citizens of New Jersey needs accurate statements from all our cities, and such

niformity as to general health regulations as are requisite to he welfare of the whole State.

2. We submit that all cities of over ten thousand inhabitants hould by law be provided with one or more sanitary inspectors. The experience of all English cities, and especially of cities of our own country, has shown that the evils of close city life are uch as to need that kind of watchfulness afforded by inspection as a system. When this is left to a police force it is recognized as a duty entirely different from that for which a police force is created, and it comes in as so incidental and special as never to be well reached in large cities by this plan. Sanitary inspection is of itself a distinct service. It requires some special knowledge of proper health conditions, a careful inquiry into departures herefrom, and a knowledge of the most efficient methods of elief and executive ability in the carrying out of details. We ave known of cases in which one or more efficient inspectors of his character have been able most economically and efficiently o accomplish more for the health of our citizens than a whole olice force. The State should see to it that our larger cities be more uniform in this kind of supervision.

3. It should be made the duty of the Common Council of ach city through its Health Board, Health Physician, City Clerks, Assessors or Inspectors to have definite oversight of vital tatistics; to inquire into neglects, and thus actively to aid in uch measures as shall secure accurate returns. So important is correctness in a general census conceived to be that our ational Government and our State authority alike secure this s a part of their jurisdiction of the citizen. In no item is it o important as in that which relates to the social conditions, ncrease and decrease by death and sickness of the number and rigin of the population.

It is now recognized that accurate returns of such statistics re indispensable to a full and accurate study of those preventble diseases which are now known to occasion over one-third of ll deaths, and to add so enormously to popular invalidism. he average city father cannot be expected, amid so many other uties, to turn his attention to so special a study. But its imortance having been authenticated by this State, as it now is y all advanced governments, it behooves that the State see to it hat municipalities secure an accurate return, which, in time,

will aid them in comparing wards or localities within their own limits, and so help both State and city in conserving the general health.

4. We respectfully submit that some general law should define more closely what are the vested rights of cities, as well, indeed, as country districts, as to the definition of nuisances and their abatement, and how far the decisions of Boards of Health may be acted upon as final.

In many cases the action of appeal is such that the delay perpetuates a nuisance and renders it impossible, if such appeals are permitted to stay proceedings, for a Board of Health to act as it needs to do for the service of the citizen. Sanitary codes have now so far gained authority that it is no longer doubted that Boards of Health may be safely delegated full jurisdiction to the extent of abatement, being afterward, if need be, held responsible for their acts. Difficulties constantly arise as to the rights of such boards, unless they are, in part, defined in city charters or by general enactment. After the decisions of the last three years in the abattoir question in Boston, and in that of the Board of Health of New York City, it is quite in the power of general legislation so to enact, as greatly to simplify the method of relief, so as not to jeopardize the ultimate right of contestants, and yet so also as not to involve the life-right or right to life of those who are being injured while the rule is suspended. We beg leave respectfully to refer your Commission to the Massachusetts decision in the abattoir case and to the decision in the New York City case.

It is not the desire of our Board to claim anything that could at all be construed into an infringement upon the corporate jurisdiction of cities.

Neither is it our desire to condone anything in which cities, if left to themselves, are likely, by over-sight or by want of co-ordinate action, to jeopardize our whole civil and constitutional and health rights to a degree much more perilous than any exercise of general jurisdiction in matters so intimately pertaining to the welfare of all.

So definite has our knowledge become of the care of population as a great national resource and a great public economy, of the avoidable impairments to which it is subjected, and of the need of co-ordinate care of our cities, especially in those health matters,

which involve a common interest, we cannot but insist that general law should, at least, require local law, and should see to it that in important particulars local authorities are brought into such relations with State authorities as to secure information to the State of the condition of its cities, and co-operation in such matters as need both local jurisdiction and general tabulation and report.

We therefore beg of your Honorable Commission that you either prepare some form of law which in your high legal and official judgment shall secure such results, or that in your report you give to the views which our Board is thus permitted to present to you, the sanction of your distinguished approval.

In some slight legislation which the State Board of Health will have occasion to ask the coming winter, it would be the view of our Board to introduce a section requiring local Boards of Health, defining their powers, requiring an annual report to the State Board of Health, and requiring them to make it obligatory to inquire each year into any neglects of vital returns. Beyond this do we not believe it wise at present to go. While up to this point specification is needed, yet the actual exercise of power must be left to local authorities—with perhaps right of appeal if they choose in certain matters to the State Board of Health. In few of our cities we do now find sufficient power. There is also an absence of intelligent conviction on the part of the officers and of the people as to the necessity of exercising it, and a want of close and exact knowledge as to sanitary matters on the part of leading citizens. Law so far as really necessary is desirable, and when only a little in advance of popular sentiment is often educational.

Harm is done both by the absence of adequate authority and by enactments, which if not burdensome to the more enlightened sanitary communities, would be so to many, because too far in advance of public opinion, and if enforced react to the permanent discredit of a most important social interest. While this should not lead us to hesitate in asking what is really needed, it does lead the State Board to canvass with great care its own individual suggestions and those of others, and to seek a wise singling out and specification of what is now essential and

expedient rather than an attempt to prepare a complete sanitary code for our cities, which however broad in its enactments and penalties, would practically add too much to the dead-letter literature of our statutes.

September, 1879.

Signed, E. M. HUNT, M. D.,
C. F. BRACKETT, Ph. D.,
E. A. OSBORNE, C. E.,
Committee of State Board of Health.

JNDERTAKERS AS GUARDIANS OF THE PUBLIC HEALTH,

ND SUGGESTIONS TO THEM IN THE HYGIENIC MANAGEMENT OF BURIALS.

BY EZRA M. HUNT.

Next to the physician, no class of our citizens is so uniformly brought in contact with the localities of fatal diseases as are undertakers. When an epidemic is raging they must be most in duty. In the more common cases of prevalent and mortal disease, they are consulted in all the details of management. So important has this office been considered in some countries and States, that a license or registry is required. A want of knowledge on their part will prolong the risks of the sick room, may endanger themselves and their families and make them the common carriers of contagion to communities. It is of great importance not only that they know the proper conduct of a funeral in its convenient or artistic service, but that they be so intelligent as to methods of cleanliness and disinfection as by their appliances and advice to aid in diminishing the risk to public health often accruing from local disease. In a somewhat extended correspondence for the last two years, we have found many of them intelligent or inquisitive as to the new facilities for safety afforded by recent methods. Many, however, pursue their vocation, without any acquaintance with their art save the hearsay methods which they have casually adopted. Every occupation is ennobled, when, besides its mere formal duties it avails itself of opportunities for establishing its claims as an art. This is a ministry, not only of respect for the dead, but of comfort and preservation for the living. That expressive Anglo-Saxon word "undertaker," ought not only to mean one who takes people under ground, but one who undertakes to do something in the interests of those that remain.

We beg to impress all undertakers with the opportunity they have to benefit society in the interests of public health and to ask of them that they magnify their office in using it as an occasion of enforcing the strictest rules of cleanliness and disinfection. We greet them as almoners of the public health, and ask their co-operation in efforts to prevent the spread and fatality of disease.

Their sanitary relation and jurisdiction includes such cleansing, preservation and direction as to the dead body as shall make it least hazardous to the public health, and such dealing with the clothing, furniture and household where the death has occurred, as shall do most to prevent contagion or to diminish that less specific befoulment of the air which also is unfavorable to health.

The Jewish mode of sanitation, as revealed in Scripture and as illustrated in profane history, is well worthy of note as an ensample. Immediately after death the body was well washed, generally with a strong solution of native carbonate of soda called nitre. It was then well anointed all over with some fragrant oil. Most of the essential oils have disinfectant properties. In some diseases, as scarlet fever, for instance, oil serves a valuable purpose in preventing particles from the skin from floating in the atmosphere. Oil or vasaline can be used still with advantage. "The corpse was wrapped in linen, wound around the limbs separately, for the better effect of the embalming ingredients and the more perfectly to saturate the flesh." The Talmud describes the custom as a wrapping around of the separate limbs and a loose sheet over the whole. The use of ointment and spices seems to have been universal, although the kind and value of the spices varied with the rank or ability of the family. The spices were dry and finely powdered and sprinkled within the bandages, or wet and mingled with oils or resins. Myrrh, aloes, etc., were used in connection with more odorous substances, in order to combine astringent and preservative effects. It was not merely a substitution of odors, but an active disinfection. King Asa was laid in a bed of spices. In the embalming of our Saviour we are told that a hundred pounds of spices were given by Nicodemus. When a death occurred in the house, "according to their custom great quantities were burned to perfume the chamber, and especially to pay universal respect."

In the Egytian method for embalming, the body was anointed repeatedly with oil of cedar, myrrh, cinnamon, and was then put into a solution of the nitre or native carbonate of soda for about forty days, "by which process it was preserved from decay, retaining at the same time a life-like appearance." It was afterward taken out, wrapped up in long linen bandages dipped in myrrh, and then closed with gum.

The common people of Egypt were embalmed by means of bitumen, with which the corpse and its envelopes were smeared. Sepulchres have been opened in which thousands of bodies have thus been preserved in robes without coffins.

The Jews while not so elaborate in embalming for continuous preservation, yet in preparation for the burial carried out these methods to the full extent necessary for cleanliness and disinfection. The washing and anointing, the use of spices, and the bandaging of the body in linen seem to have been always used, although on account of ceremonial uncleanness and the heat of the climate, early burial or entombment was practiced. No corpse thus carefully cleansed, anointed, spiced and bandaged could possibly be a source of contagion. We do not wonder that the body thus prepared needed no coffin for the bier, but could be carried to the grave as much an emblem of purity as the white linen which enfolded it. In our modern plans we have more complicated but not more cleanly methods. We allude to this as illustrating the simple way of dealing with the dead body in a hot climate so to make it innocuous to the living.

We live in a period when very much is said about the communicability of disease and the methods of preventing it. Many instances are on record like that of 1878, in the yellow fever of Grenada, and the one as to diphtheria, occurring the same year in Monmouth county, in both of which it is alledged that the epidemic spread through the medium of the corpse. Boards of Health are issuing mandates as to non-attendance at funerals and non-exposure of the body in case of communicable disease. The Brooklyn Board of Health directs the burial of every child who has died of any infective disease within twenty-four hours, unless special permission is given to the contrary, and further that "the funeral of such person is to be strictly private, no other vehicle than a hearse being allowed." Chicago has had orders of similar rigidity. We regret the necessity of any law

which limits the law of affection to this degree, or that so repels expression of sympathy in the time of bereavement. We are of those who believe it far more important to teach and insist upon rigid method of preparation for the dead body. It is within the range of present knowledge and of known skill for undertakers to deprive the corpse of any infective power, and, as a rule, to render it so safe that no such order needs to be promulgated. There are often reasons why garments or the furniture of the same room may at first hazard contagion, or why a funeral in the same building, instead of from an uninhabited assembly-room, might expose to some virulent contagion. But of all the things connected with the disease, the corpse, properly prepared, is the least likely to communicate a disease to those present at the burial if only properly cared for.

We proceed to outline the method of management by which to insure protection:

After death early attention must be given to any inward parts from which offensive discharges might escape. A small rubber hand-syringe or spray atomizer easily washes out the most accessible cavities, such as the mouth, nostrils, ears, with any of the disinfectants we have named. All openings from any internal organ or cavity should be neatly plugged. When, as from the bowels, much discharge might occur, an egg-shaped plug should be carefully adjusted. For this purpose a small wad of cotton or oakum may be saturated with the copperas or chloride solutions or chloride of zinc, named in the article on Disinfection, or with tar or the sticky portion of turpentine.

Better still, carbolized paper or cotton can now be had at small expense and used dry. This is suitable where we must place some absorbent in the cavity of the mouth, inside of the teeth or in the nose or ears.

WASHING OF THE BODY.

All garments that have been upon the body during the sickness should be removed, not to be replaced, and the body be laid for washing on a table or cot covered with paper or linen. The body should then be thoroughly wiped and cleansed all over with soda borax, in the proportion of a teacupful dissolved in a quart of water or the chloride of zinc solution. (See article

nfectants.) If soap is used it should be Castile or carbo-
ap, the greases of which do not decompose so rapidly as
f laundry and scented soaps. Anointing with Vasaline is
od.

ıe face and head are more especially exposed these need
eful cleansing and washing, and use of absorbents hereto-
erred to. Where the hair is long it is desirable that it be
removed, but if this is objected to, it also can easily and
be thoroughly washed with the zinc solution. The
t head-dress or cap easily concealed any change of the
nd would still be in taste if fashionable. It is always
ıry that very careful attention be paid to the proper
ng of the hair; in case of any unusual odor of any
ous disease the chlorinated soda or Labarraque's solu-
ır the chloride of zinc solution noted in the article
ıinfectants, or a chlorine wash made by dissolving
ıarter of a pound of chloride of lime in a quart of
may be used instead or in addition. The National
of Health directs the use of a saturated solution of the
le of zinc as a wash, and the wrapping of the body in a
aturated with it. Dry powdered borax sprinkled over the
after the washing and wiping is an excellent cleanser.
st well moistened with the chloride of zinc is also recom-
d to be placed in the coffin. Any sore or abrasion or
should be cleansed when possible, and be freely covered
opperas wash, powdered charcoal, common salt, or any of
ansing or drying articles above named.

nall bag of sawdust or fine shavings, or cotton or wool,
id with salt, borax or charcoal, may properly be closely
l about the thighs. One good authority recommends that
ıe cases of delay or transportation the body should be
d with sawdust, to which has been added tar or a pound
:y black, or other crushed or powdered charcoal, so as to
any possible gases, or to prevent escape of any fluid.
s in attendance upon the sick or those laying them out
increase their risks by such cleanliness. Indeed those
uring sickness, or in caring for bodies after decease, are
ır with methods of cleansing and disinfection are those
ıemselves escape, besides protecting society.

xhuming the dead, Blythe directs that all bodies should
ered with tar or saw-dust saturated with carbolic acid.

In the Franco-Prussian war tar was thus freely used. We think the styptic clays so plenty in New Jersey from which so much alum is made, when dry and ground may thus answer a valuable purpose as a cleansing and antiseptic covering.

A brine made of good common salt and a little saltpetre is highly preservative of bodies and is easy used and drained off by a screw opening.

Embalming, as practiced in modern times, seems to have been most successful with the use of a saturated solution of chloride of zinc. Burnett's Fluid, so valued as a disinfectant, is a chloride of zinc solution, although not so strong.

The Souquet, or chloride of zinc method, was tried at Paris in competition with others and so preserved a body that when exposed to the air fourteen months after, it dried without putrefaction. Richardson, in his experiment (1876) injected the saturated chloride of zinc solution into the tracheal artery and repeated it after six hours. The abdomen was emptied of air by a fine puncture and zinc colloid and a gelatinous preparation of zinc thrown in. The Milwaukee law requires that in all contagious diseases there shall be in the bottom of the coffin from four to six inches of saw dust saturated with chloride of zinc solution.

The chloride of zinc solution is now given the preference over all other disinfectants for this purpose. The 50 per cent. solution of Squibb which costs twenty-five cents per pound at wholesale, is sufficiently strong, and may be weakened unless there are some special instructions for active disinfection. As a wash of the body it is the best, as there is no risk of discoloration therefrom. While physicians who prepare and preserve bodies, prefer injection into the arteries, other simpler methods will answer for undertakers. A very small trocar, such as is used for piercing the abdomen in dropsy, can easily be used in the hands of any undertaker. We know of one city undertaker in this State, who, in hot weather, has often found it sufficient to inject from a pint to a quart of the solution by a small pierce into the abdomen which entirely closes itself on the withdrawal of the nozzle of the syringe. It is easy to have the nozzle of the syringe so shaped as to make the puncture by it. Where it is preferred the Fountain syringe may be used, and so the fluid be allowed to flow into any cavity. Since the invention of the

ordermic syringe, it has been frequently shown how feasible to disinfect by merely infusing the zinc solution at various es under the skin.

ll these slight punctures as well as those for chest or abdomi- injections, can be made without any disfigurement, and are n far more practicable than the ponderous methods now in . We know of no prominent department of handiwork in ich there is more opportunity for improvement.

With these internal methods of preservation by the introduc- ı of fluid into closed cavities, and with the proper cleansing l disinfection of the outer body, the corpse can be preserved the necessary period previous to the funeral.

When in piercing any internal cavity there is confined gas or l odor escaping, it is easily absorbed by holding over the e a small sponge which has been soaked in the chloride of ;, or other disinfecting solution. Some who have expressed atisfaction with present methods, are now using the Egyptian balming fluid, or other patented articles. There are plans of y preservation now in use in all our medical colleges, which equally applicable to the preservation of bodies for burial. doubt the more thorough method is to inject into the arterial em. A large artery in the neck or beneath the collar bone asily exposed and opened by a very slight incision. • A hol- needle is inserted and tied in place, then the chloride of is slowly and not too forcibly injected. Not over three rts are generally needed.

n intelligent undertaker of this State has informed us that has always succeeded by filling the abdominal cavity ugh a small opening, into which he introduces the tube of a ison's syringe. All external methods of cleansing being also nded to. Each chest cavity is thus easily infused with a few ces. Even this would only be needed in hot weather, or n the body is to be preserved for transportation, or in case ome epidemic disease. The puncture should be made just w the navel or for the chest, between two of the ribs of the t side.

speaks little for science or art, that so cumbersome and ensive an apparatus as the ice-box is now our only reliance.

'e insist that both the undertaker and those who employ him ıld come to recognize his care to extend to directing the

preparation of the body for burial, as well as to other arrangements. If fear of disease or carelessness leads him to neglect these matters, he is not less exposed and does not accomplish a high part of his mission. We believe that friends pay as readily for these exact and skillful attentions as for the mere mercantile oversight.

The undertaker needs not only practice, but a technic knowledge of his art. The spray forms of syringes, trocar, sponges, carbolized paper and cotton, bandages, wadding, two or three of the most approved disinfectants, all put up in a case of convenient form, belong as much to his art as does the medical case to the physician.

The last ten years have developed possibilities of care for the dead wholly new and greatly valuable. We believe the time not distant when the occupation will be followed as an exact sanitary art, and become a great adjunct in the checking of contagious diseases. The art of preservation and disinfection is now so complete that if only the undertaker knows the details of proper cleansing and dressing, and keeps himself supplied with the proper appliances of his art, he will not only add to his own skill but make himself a worthy and effective custodian of the public health.

It is greatly important, also, that the care of the undertaker should extend to the surroundings of the fatal sickness.

He should learn how the rooms may be made least likely to convey disease or to deteriorate the air. We have many times attended at funerals where both the coffin and the room that contained it has been closed for some time before. The stifled air thus charged with particles of decay, even in cases of non-malignant disease, has occasioned faintness and discomfort which might have been avoided by a flushing of fresh air and removal of close curtains.

The undertaker should be familiar with the use and value of circulating air, cleanliness and disinfectants, both for the house and the premises, and often more than any one else just at this time is in a position to give advice and direction which will be heeded and obeyed.

We designedly associate an article on disinfectants with this number of our report, and send the report to the undertakers in the State, that they may thus have ready at hand a partial guide

a so important a relation to the public health and common welfare.

COFFINS.

A word needs to be said in reference to the coffins at present in use. The heavy wooden or iron coffins are only defensible in cases where the dead must have long transportation before burial. In usual cases, the body between death and burial, unless kept in a preservative liquid in a coffin, does not need an attempt at exclusion of air, which only means air confined so as to become unpleasant. Proper preparation of the body, free access to air, and a placing of the corpse in the coffin only a short time before burial is the better custom.

We fully agree with the views expressed by Haden, Richardson and others, that the coffin should be nothing more than an easily destructible shroud, in which the mortal remains may be placed until they are deposited in the earth. "The present coffin," says Richardson, "is after the mode of an Egyptian sarcophagus and is probably an imitation of that receptacle. In the *form* of the receptacle there is nothing objectionable, and if the popular taste wills that it shall be maintained, so be it. But the *structure* must be so modified that the instant the body is placed in the earth, it shall either be in direct contact with its surrounding earthy matter, or it shall be separated from it by some simple organic material that is easily and rapidly destroyed." If persons desire their friends preserved after death, let us go to embalment now so simple and expedient, or else let us not long interrupt natural decay, and by an artificial method, substitute a process most loathsome, and wholly destructive of natural methods of decomposition and soil appropriation. A revolting, but true picture has recently been drawn by an eyewitness, of an old grave yard exhumed, as showing how soil was contaminated, water courses befouled, and death itself made more hideous. We have recently lighted upon another description of a yard prepared. It is wonderful how quickly a carbonaceous soil or one of sand-lime and carbonaceous matter mingled, will dispose of remains placed in it free from woody coverings.

The Messrs. Turnbull, of Glasgow, desirous of illustrating the power of charcoal as an absorbent and deodorizer buried a horse in an eight-inch surrounding thereof. In twelve months the whole except the skeleton was absorbed without in the mean time the least trace of decomposing effluvia. Porous and well drained earths have a power quite analagous. In such soils it is stated that complete removal of a human body has taken place in five years, and complete destruction of all but bones and sinews will take place in twenty to thirty weeks. If we mean earth to earth, dust to dust, it is better to let it be accomplished in the time which nature attempts. The earth to earth coffins of the London Metropolis Company, or the wicker coffins now in frequent use in England, have many advantages for crowded populations, and will to some degree interrupt the plan which in our cities "has led us to accumulate in our midst a vast store of human remains in every stage and condition of decay." The Japanese bury in sitting posture, and often after the coffin is in the grave, thrust aside the thin lid and so give a free access to the earth.

While we may not expect any sudden change from confirmed methods, it is well to have attention directed to modifications which may be desirable. The woods at least from which coffins are made might be much lighter. Where preservation is desirable for transportation a proper lining of antiseptics and proper preparation of the body for burial will do far more than an attempt to make air tight by boxes.

The welfare of the living and a guarding against the spread of disease, must not be lost sight of, while all proper respect is shown for our departed ones. Indeed, it is a recent tendency to constrict attendance at funerals within too narrow limits and almost to prohibit tokens of affection, that has in part led us to inquire whether there is not a care and preparation of the dead for burial, such as limits rather than extends disease, and so makes funeral obsequies consistent with assured protection from infections.

We believe the protection of personal and public health is quite in accord with attendance upon the remains of those who are removed from us. But this means a preparing for burial quite different from that now practiced. It means cleansing, anointing, disinfecting, preparation and burial as a distinct,

xplicit art; not as a trade which can be taken up at random. t has definite rules which, if carried out, will insure against anger of infection from the dead. It means suggestions to the nmediate household as to their own clothing and vicinage, hich, with the careless or uninformed, are far more riskful than he person deceased. It means disposal of remains which shall e compatible with the highest interests of the living.

All this adds sacredness and solemnity and token of respect, or the law of purification and cleanliness like the law of care- ulness for all human welfare has in it the very essence of espect, honor and affection. The death of the flesh seems to us nore like the life of the spirit, when thus it is decently conveyed o the earth so as to closely obey the processes of nature and oon become a part of that vitality which shall remain until the ormer is restored.

To all undertakers we commend their work as an art, as well s a service, and ask them in it to recognize themselves as apable of conserving some of the most important sanitary nterests of society.

SANITARY LEGISLATION.

BY E. S. ATWATER, ATT'Y.

INTRODUCTION.

The necessity for sanitary legislation or legislation to protect ıe public health, is founded in the ignorance, negligence and ılfishness of mankind. In a large community there are a vast umber of people who are utterly ignorant of the fact that uman life may be prolonged, and the general health and the ealth of the individual be promoted by following the simplest nitary precautions. But we may go a step further. There is so a tendency to neglect matters of this nature even where ıere is some knowledge on the subject. People think there is) hurry about attending to such things, and they let them go ·til the evil has been done and the seeds of disease are not ` y planted but growing up. But beyond this is the inherent ishness, meanness or parsimony, by whatever name it may be led. Sanitary measures cost something. They may even cost : destruction of property to do them properly. The landlord o is reaping large rents from the overcrowded and filthy tene- nt, has no ear for sanitary improvements. They might in : end make his property more valuable, but he has a sharp : for his present gains. Hence unless some power is brought bear from without, some agency that has power to do the thing ıuired, if necessary, in many cases nothing will be done, and, nerally, progress will be slow.

The basis or foundation of sanitary legislation is in what is rmed the "police power." It is a power often referred to in gal works. Says Mr. Justice Field, of the United States Su- :eme Court: "That power undoubtedly extends to all regula- ons affecting the health, good order, morals, peace and safety of ıciety, and is exercised on a great variety of subjects, and in most numberless ways. All sorts of restrictions and burdens

are imposed under it, and where these are not in conflict with any constitutional prohibitions or fundamental principles, they cannot be successfully assailed in a judicial tribunal."

Says Mr. Justice Miller of same court, referring to police power: "Upon it depends the security of social order, the life and health of the citizen, the comfort of an existence in a thickly populated community, the enjoyment of private and social life, and the beneficial use of property."

Says another Judge: "It extends to the protection of the lives, limbs, health, comfort and quiet of all persons, and the protection of all property within the State, and persons and property, are subjected to all kinds of restraints and burdens in order to secure the general comfort, health and prosperity of the State; of the perfect right of the Legislature to do this no question ever was, or upon acknowledged principles ever can be made, so far as natural persons are concerned."

But while such is the substantial foundation on which sanitary legislation rests, to-wit, that general welfare must be protected, even if it is at the expense of some individuals, yet this very principle shows us that, in the nature of things more or less opposition will be developed to the execution of all sanitary laws. It has been claimed, and is now and doubtless will be claimed, that such laws interfere with vested rights, that before a health officer does anything there must be a trial by jury and objections of similar nature. Hence it is obvious that such laws must be framed so as that while they accomplish the end arrived at, they do not interfere with private rights any more than is absolutely necessary.

A municipality has no inherent power to enforce sanitary measures. The powers of municipal corporations are based entirely on legislation, and they must act within the scope of such legislation. If, therefore, no powers to make sanitary regulations have been conferred upon a municipality by the Legislature, it follows that such municipality has no such powers. The public good alone is not a foundation upon which a municipality can act.

SUBJECTS OF SANITARY LEGISLATION.

I now pass to consider some of the subjects which properly come within the scope of sanitary legislation.

1. The gathering and diffusing of information on subjects re-
ing to the public health, including the Department of Vital
atistics. Knowledge must precede action; knowledge as to
ether a state of things exists which requires action of a sani-
ry nature; knowledge from which deductions and generaliza-
ns can be made as to the growth and spread of disease, and
e causes which produce an unwholesome sanitary condition;
owledge as to the result of measures undertaken to promote
e public health; and finally, knowledge as to the best methods
be applied for the promotion of the public health. These gen-
alizations and conclusions, to be of value, must be derived from
rge observations.

It is impossible to estimate too highly the value of Vital Sta-
istics carefully gathered.

Says an eminent writer: "Considered *physically*, the main
bject of a correct civil registration of births, deaths and mar-
iages, is to aid in disclosing the causes of disease; considered
gally, the object is to provide the means of tracing descent and
roving personal identity; and considered *politically*, it is to
ssist the government in arriving at correct conclusions with
egard to measures of internal economy, taxation, employment
nd commerce.

As the world no longer affords one instance of the unanimous
greement of the people of any one country for one form of
eligion, governments can no longer prudently leave the regis-
ation of births, deaths and marriages, solely to the minister of
e State Religion, if there be one.

In regard to the matter of diffusing sanitary information, I
ote the remark of Dr. Elisha Harris, the eminent and
orough Registrar of Vital Statistics of the Metropolitan Board
Health of New York, as follows: "The task of perpetual
eansing and sanitary renovation by the civil authorities of
oards of Health, though conferring great present benefits,
eeds to be aided by popular and definite sanitary instruction,
lse all this present endeavor might prove to be another work of
ysiphus, and the people might forget that they have any per-
nal concern in the efforts of sanitary officers."

In this connection I deem it proper to refer to the very ex-
llent and timely suggestions and directions, issued by the
tate Board of Health of New Jersey, during the past season.

2. The practice of medicine and the sale of so-called medicines, is a subject that properly comes under the head of sanitary legislation, when it is considered how much harm may be done by unlearned and unskillful practitioners, and the health-destroying compounds which are put forth under the name of medicines, it is evident that there is scope for legislation in this regard.

In this State the law has gone to the extent of providing a competent and educated body of physicians, through the medium of the State Medical Society. It would seem proper to provide for an examination of all who desire to practice medicine, by a competent medical board; that all who engage in the business of compounding medicine, should pass an examination to test their competency, and also to regulate the sale of medicine, so as to protect the public against the nostrums of quacks.

3. Vaccination and other measures preventive of disease. It is not my purpose to argue the importance of vaccination. When we consider the danger to a community of a single case of small pox, not properly isolated, and the peril to which an unvaccinated person is exposed, it is obvious that the authorities should be empowered to provide for thorough vaccination.

4. The regulation of noxious trades and business, including manufactories. Here it would seem at first sight that there might be danger of interfering with private rights, and that legislation relating to such matters might be opposed to fundamental principles in regard to the property and the right of the individual to use his own. There are businesses, such as slaughter houses for instance, which are absolutely necessary and must be carried on, but at the same time there existence in a thickly settled community is fraught with danger. The subject has been thoroughly discussed and the right of the State to enact such laws, has been affirmed by the United States Supreme Court in certain cases which came up from the State of Louisiana and are known as the "slaughter-house cases," reported in volume 16, Wallace's Reports. I deem the matter of sufficient importance to give a brief synopsis of the cases. They grew out of an act of the Legislature of Louisiana, entitled "An Act to Protect the Health of City of New Orleans, to locate the stock landings and slaughter houses and to incorporate 'The Crescent City Live Stock Landing and

Slaughter House Company,'" which act was approved in March, 1869. This act granted to a corporation created by it, the exclusive right for twenty-five years to have and maintain slaughter houses, landings for cattle and yards for enclosing cattle intended for sale or slaughter within the parishes of Orleans, Jefferson and St. Bernard, in that State, (a territory which it was said contained 1,154 square miles, including the city of New Orleans, and a population of between two and three hundred thousand people), and prohibiting all other persons from building, keeping or having slaughter houses, landings for cattle, and yards for cattle intended for sale or slaughter within those limits, and requiring that all cattle and other animals intended for sale or slaughter in that district should be brought to the yards and slaughter houses of the corporation, and authorizing the corporation to exact certain prescribed fees for the use of its wharves and for each animal landed, and certain prescribed fees for each animal slaughtered. The court held that this grant of exclusive right and privilege, guarded by proper limitations of the prices to be charged, and imposing a duty of providing ample conveniences, with permission to all owners of stock to land, and of all butchers to slaughter at those places, was a police regulation for the health and comfort of the people, (the statute locating them where health and comfort required), within the power of the State legislatures, unaffected by the Constitution of the United States.

I may, in passing remark that this law affected the business of some 1,000 persons, and that individuals and associations of butchers brought suits to prevent its being carried into effect, and that the matter was thoroughly litigated with the result I have stated, thus showing conclusively that there is no fundamental objection to the class of legislation referred to.

5. Providing sufficient means for dealing with nuisances, including their abatement and removal. Of the absolute necessity of vesting in some body power to deal with nuisances which imperil health in thickly settled communities, there can be no question. If the community is to be left to the ordinary machinery of an indictment or other proceedings of that nature it is obvious that the progress in enforcing sanitary regulations will be slow. If, on the other hand, there is an organization whose care is the public health, and whose duty it is to establish

sanitary regulations, and then to enforce them, we may expect systematic and substantial improvement. Of the manner of dealing with such matters, I shall speak hereafter.

6. Efficient sanitary inspection of dwellings and public buildings, particularly schools as to proper ventilation, drainage and other sanitary precautions and disinfecting generally. There can be no question that the health is in danger in a large gathering of people in buildings where the atmosphere becomes fœtid from lack of proper ventilation, and noisome gases are exhaled from defective sewage arrangements. It is a too common occurrence that one after another in a family is stricken down with disease, the causes of which are found to be in the unwholesome sanitary conditions of the dwellings.

7. The regulation of trade in articles of food to the extent of preventing the sale of unwholesome articles is also a proper subject of sanitary legislation. It is a well-known fact that many things manufactured for use as food, are mixed and adulterated with substances which have no nutritive elements, and are in many instances of a deleterious character. Then again, stale meats, fruit and vegetables are often offered in market at low rates. The danger to health in this manner, especially in the warm season, need not be enlarged upon. Then again, there is the danger of diseased meat being put upon the market. Against these things the individual purchaser cannot protect himself always if he would. Hence the necessity for some legislation which will efficiently protect the health of the public in this regard.

8. Quarantine Laws. Such laws come under the jurisdiction of the States. The happy effect of such laws is seen in that while vessels containing persons sick with pestilential and contagious diseases arrive at the port of New York, yet these persons are rigidly kept out of New York City, and such vessels are subjected to thorough fumigation and disinfection. There can be no doubt that it was due to the vigorous enforcement of the quarantine law during the past season that yellow fever was kept out of the great cities at the head of New York Bay. Such measures, no doubt, require the exercise of a great deal of authority on the part of those entrusted with their enforcement but the common sense of mankind concedes their absolute necessity.

Quarantine regulations also relate to the separation of individuals afflicted with contagious diseases and even of whole communities where such diseases are prevalent.

It may be added that there are a variety of other matters, which are proper subjects of sanitary legislation, such as keeping pure the water supply of cities and villages, the prevention of the overcrowding of tenements, proper sewage and the like, but I do not deem it necessary to go further into detail. It is obvious that there is a broad field for wise sanitary legislation.

We come now to consider the jurisdiction within which sanitary powers may be exercised. The subject of the public health is a matter of large importance. It is not limited to any State or municipal boundaries. It is scarcely a year since the public health of the people of this country was imperilled by the ravages of a contagious disease which had become epidemic in some of our large cities. To the coping with the disease in such proportions no State or local health authorities are adequate; concerted action is required. The general government rendered what aid it could under the circumstances, but there was no National Health Board to bring to bear its power in the emergency. So important was this matter felt to be that at the last session of Congress a law was passed establishing a National Board of Health. A United States Senator has said, "At the last session nearly $1,000,000 was voted to be used to combat sickness in the South, and under powers and discretion such as no act of Congress ever conferred before."

The National Government has also felt called upon to interfene for the protection of the public health by the establishment of National Quarantine law. By a law passed in 1878, United States officials are required to co-operate with State officers in the enforcement of the State Quarantine laws.

By other laws of the United States the Quarantine laws of the States have been recognized.

Much doubt, however, has been expressed as to the power of Congress, under the Constitution, to pass general health laws, and while it would seem for the public good that Congress should possess some power in this direction, it is not within the province of this paper to discuss the constitutional questions that have arisen.

But whatever constitutional objections may exist in regard to sanitary legislation by the general government, no such objections apply to the actions of the State governments, the theory of our system being that the States retain such powers as are not delegated to the general government. As has already been shown, the police power is exercised in a variety of ways. Probably all the States have exercised this power, in some measure, as to matters relating to the public health; but it would seem for the most part to have been done in reference to particular localities and on special subjects, as attention may have been called to them, rather than the enacting of a system of laws pertaining to the subject or a general system of enforcing such regulations. It would seem necessary to any proper regulation of these matters, that there should be some central authority or health board in each State, having some general powers, such as gathering vital statistics and other information, and diffusing the same, and supervising the local health authorities, giving them aid and direction, and setting them in motion, if necessary. In New Jersey a State Board of Health was established by law in 1877. Its powers were limited to gathering information and making reports. In 1878 a law was passed providing for the registration of births, marriages and deaths, and in 1879 a law was passed authorizing the State Board of Health to take action, with a view of setting in motion the local health authorities in the matter of abating nuisances. It will thus be seen that in this State sanitary legislation is making progress in the right direction toward dealing with the problems relating to the public health in a systematic manner.

Some of the Western States have been forward in the matter of sanitary legislation. Minnesota and Michigan have comprehensive health laws.

I present a brief synopsis of the system in Michigan:

SANITARY LEGISLATION IN MICHIGAN.

In the year 1873 the Legislature of the State of Michigan established a State Board of Health, consisting of seven members.

Their duties are summed up in the law as follows: "The State Board of Health shall have the general supervision of the interests of the health and life of the citizens of this State. They

shall especially study the vital statistics of this State, and endeavor to make intelligent and profitable use of the collected records of death and sickness among the people; they shall make sanitary investigations and enquiries respecting the causes of disease, and especially of epidemics, the causes of mortality, and the effects of localities, employments, conditions, ingestra, habits and circumstances as to the health of the people."

The local health authorities are required to report at least once a year to the State Board.

The laws of Michigan also make ample provision for the collection of vital statistics.

In 1846 laws were passed establishing Boards of Health in the towns, villages and cities. The powers given to the Boards in the different orders of municipalities vary somewhat, but would appear to be full and ample. In particular, they provide prompt methods of abating nuisances.

SANITARY LEGISLATION IN MASSACHUSETTS.

In the State of Massachusetts much practical work has been done in sanitary matters which it would be interesting and profitable to consider if time would permit.

A State Board of Health was established in 1869. Its powers at first were principally advisory, and to gather and diffuse information, to make investigations, &c. Subsequently, however, it was clothed with certain executive powers, such as, in certain cases, after hearing, to order parties engaging in trades which are injurious to public health, to desist from the same.

The reports of this Board have been very carefully prepared from year to year and are full of valuable theoretical and practical information as to sanitary matters.

In the general laws of the State, published in 1860, is a chapter, entitled "Of the Public Health and Burials."

Provision is made for local Boards of Health in the towns and cities, and their powers are defined. These Boards are authorized to make regulations for the public health and safety, respecting nuisances, sources of filth and causes of sickness within their limits. They may make orders for the abatement of nuisances after short notice, and may abate the same, if necessary, at the expense of the owner of the property.

They may also asssign places for carrying on any trade or employment which is a nuisance or dangerous to the public health, or the exercise of which is attended by noisome and injurious odors and may prohibit the exercise of the same in places not so assigned. The Board may also forbid the exercise of such trades within the limits of the town or any particular locality thereof.

Provision is made for the service of such order of prohibition upon the proper parties, and if the same are not obeyed within twenty-four hours, the Board are to take all necessary measures to prevent the exercise of the offensive trade, and the person refusing to obey becomes liable to fine.

Any person aggrieved by such order may appeal therefrom and shall, within three days after service of the order, apply to the proper court for a jury to try the question, and during the pendency of the appeal, the offensive trade or employment shall not be carried on contrary to the order, and upon any violation of the same, the appeal shall forthwith be dismissed. The verdict of the jury is to be passed on by the court and may either affirm, annul or modify the order appealed from. If the order is affirmed by the verdict, the town shall recover costs against the appellant; if it is annulled, the appellant shall recover costs and damages against the town.

LOCAL HEALTH BOARDS.

It must be obvious, I think, that in order to efficient sanitary work, there must be local authorities having health powers, a body of some sort in each community or municipality, having charge of the measures pertaining to the health of such community or municipality. No State Board of Health can be adequate to the enforcement of the sanitary regulations necessary to the protection of the health of each particular community.

Health Boards should be so constituted as not to have any political or partisan bias, for in matters of this kind, the body having authority to act, should be independent and non-partisan. Hence it would follow that such powers should not be vested in an elective Common Council or other city government. But again, in dealing with matters of public health, knowledge is required. Hence, in a proper Health Board, medical men

ıould be found. It might not be advisable to make up a Board ntirely from the medical profession; but that profession should urnish a large and influential element in any Health Board that 'ould efficiently and intelligently discharge its duties.

Still further, a Board of Health should be a permanent body nd not reconstructed each year. The terms of the members hould be for long periods, and should not all expire at the same ime. In this way the result of experience can be more efciently applied, and the methods inaugurated can be perfected nd carried to completion.

Probably most, if not all the cities of New Jersey, have some rovision in their charters for Boards of Health, or authorities f that kind. It will be found however, I think, that the powers iven to them are of a general nature, and that no methods are rescribed for dealing with the very important matters that ome before such bodies, and in general that their authority is omewhat vague and undefined in its character.

SANITARY LEGISLATION IN ENGLAND.

Some reference to sanitary legislation in England will, I hink, prove instructive. The matter has received great attenion in that country. Commissioners have been appointed from ime to time by act of Parliament to inquire into the subject, nd voluminous reports have been made by them. The result ıas been a body of sanitary legislation of great importance, nd practical value, and great good has been accomplished by liminishing the death rate and advancing the conditions of ood public health. The ravages of cholera led to the passage n the year 1845 of the Nuisance Removal Act.

In 1848 the Public Health Act was passed by which a general oard of Health was established, at the head of which was a resident appointed by the Government. In 1858 the powers f the General Board of Health were given to the Privy Council.

In 1855 other nuisance acts were repealed and a Nuisance emoval and Disease Prevention Act was passed. This act ontains some stringent definitions of nuisances. By means f these definitions a variety of causes of disease are brought ithin the operation of the law.

They may also asssign places for carrying on any trade or employment which is a nuisance or dangerous to the public health, or the exercise of which is attended by noisome and injurious odors and may prohibit the exercise of the same in places not so assigned. The Board may also forbid the exercise of such trades within the limits of the town or any particular locality thereof.

Provision is made for the service of such order of prohibition upon the proper parties, and if the same are not obeyed within twenty-four hours, the Board are to take all necessary measures to prevent the exercise of the offensive trade, and the person refusing to obey becomes liable to fine.

Any person aggrieved by such order may appeal therefrom and shall, within three days after service of the order, apply to the proper court for a jury to try the question, and during the pendency of the appeal, the offensive trade or employment shall not be carried on contrary to the order, and upon any violation of the same, the appeal shall forthwith be dismissed. The verdict of the jury is to be passed on by the court and may either affirm, annul or modify the order appealed from. If the order is affirmed by the verdict, the town shall recover costs against the appellant; if it is annulled, the appellant shall recover costs and damages against the town.

LOCAL HEALTH BOARDS.

It must be obvious, I think, that in order to efficient sanitary work, there must be local authorities having health powers, a body of some sort in each community or municipality, having charge of the measures pertaining to the health of such community or municipality. No State Board of Health can be adequate to the enforcement of the sanitary regulations necessary to the protection of the health of each particular community.

Health Boards should be so constituted as not to have any political or partisan bias, for in matters of this kind, the body having authority to act, should be independent and non-partisan. Hence it would follow that such powers should not be vested in an elective Common Council or other city government. But again, in dealing with matters of public health, knowledge is required. Hence, in a proper Health Board, medical men

should be found. It might not be advisable to make up a Board entirely from the medical profession; but that profession should furnish a large and influential element in any Health Board that would efficiently and intelligently discharge its duties.

Still further, a Board of Health should be a permanent body and not reconstructed each year. The terms of the members should be for long periods, and should not all expire at the same time. In this way the result of experience can be more efficiently applied, and the methods inaugurated can be perfected and carried to completion.

Probably most, if not all the cities of New Jersey, have some provision in their charters for Boards of Health, or authorities of that kind. It will be found however, I think, that the powers given to them are of a general nature, and that no methods are prescribed for dealing with the very important matters that come before such bodies, and in general that their authority is somewhat vague and undefined in its character.

SANITARY LEGISLATION IN ENGLAND.

Some reference to sanitary legislation in England will, I think, prove instructive. The matter has received great attention in that country. Commissioners have been appointed from time to time by act of Parliament to inquire into the subject, and voluminous reports have been made by them. The result has been a body of sanitary legislation of great importance, and practical value, and great good has been accomplished by diminishing the death rate and advancing the conditions of good public health. The ravages of cholera led to the passage in the year 1845 of the Nuisance Removal Act.

In 1848 the Public Health Act was passed by which a general Board of Health was established, at the head of which was a President appointed by the Government. In 1858 the powers of the General Board of Health were given to the Privy Council.

In 1855 other nuisance acts were repealed and a Nuisance Removal and Disease Prevention Act was passed. This act contains some stringent definitions of nuisances. By means of these definitions a variety of causes of disease are brought within the operation of the law.

The local authorities can give notice for the removal of any nuisance, and if this is not attended to, a summons can be issued and offending parties brought before a magistrate. In certain cases also where works are necessary to be done, the local bodies can do the work and charge the person on whose premises the nuisance has existed.

The duties of a medical officer of health and of a sanitary officer are also recognized; and these officers have power given them to inspect premises where they suspect a nuisance to exist. The law provides for inspectors to inspect articles of food exposed for sale, and if found bad to bring offenders before a magistrate. These are only a few of the provisions of the act. I quote the following remarks in regard to the English system:

"The sanitary laws not only extend to more subjects, but they are more stringent, and are enforced by a more discriminating public sentiment and a more vigorous administration than here. All England, for example, is divided into 15,000 sanitary districts, with a sanitary authority in each, and since 1872 there has not been a spot on the surface of England that has not been liable to feel, and, if it needed, which has not felt the direct exertion of such authority. These 15,000 small districts are grouped into twelve larger divisions, and in each of these divisions there is an inspector, who reports directly to the 'Local Government Board,' in London, and over that Board is one of the Secretaries of the State, who is a member of the Cabinet. Connected with the Board is a chief medical officer—now Dr. Simon, perhaps the greatest sanitarian in the world—who has a similar relation to the Privy Council. The system is not a centralized or imperial one, but is such as to devolve the duty and responsibility as to each of the 15,000 districts, mainly upon its own local sanitary authority. But if in any district the death rate or expenditure is too high, those responsible for it are liable to account for it to the Local Government Board.

If local complaints are neglected or nuisances are allowed, one of the twelve inspectors will soon appear in the district and make an investigation.

All accounts of expenditures by each of these 15,000 authorities must be made up in a common form, and they are supervised by the 'Local Government Board.'"

THE METROPOLITAN BOARD OF HEALTH OF NEW YORK.

This Board owes its existence to the necessities of the city of New York, and vicinity. No one will, I think, contend that ample health powers should not be vested in some authority for the protection of the health of that great city—the commercial centre of the country. This Board was established in 1866. Prior to that, health powers had been vested in the Common Council and had been exercised in a very inefficient manner. That Board at its organization consisted of nine members—three of them physicians, one the health officer of the port, one layman, and the other four the four Police Commissioners of New York city. The number has since been reduced, leaving the physicians the predominant element. The district included was the counties of New York, Kings, Westchester, Richmond and a portion of Queens, thus embracing New York City, Brooklyn, Staten Island and adjoining districts. It has since been reduced in extent. Health powers of the largest kind were conferred upon this Board, and the Board proceeded to put them in effect, enacting a health code which deals with a great variety of matters, and involves a great deal of system and energy in giving them proper effect.

In the report for 1867 (the 2d report) we find the following language:

"The Health Department of a great commercial district, which encounters no obstacles and meets with no opposition, may safely be declared unworthy of public confidence, for no sanitary measures, however simple, can be enforced without compelling individuals to yield somewhat of pecuniary interest, or of personal convenience to the general welfare."

The Board did meet with such opposition, and litigation of the most determined character followed. Parties whose alleged rights were interfered with by the Board of Health, organized and sought redress in the courts against the action of the Board, but without success. The results of the litigation are thus stated in the report of the Board for the year 1868, on page 155, by the Hon. Dorman B. Eaton, then counsel of the Board, a gentleman who has given great attention to these matters:

"1. That it was within the constitutional power of the Legislature to create a Board of Health, the members of which

should be nominated by the Governor and confirmed by the Legislature or Senate.

2. That such Board had the power to pass ordinances, reasonable and proper to be observed, for the protection of life and health within the Metropolitan Health District, and that the penalty fixed by law as recoverable against those who should disobey them could be recovered.

3. That the Board had authority to make proper orders for cleansing premises, and for removing causes that made nuisances by endangering the public health, etc., as the law provides, and that such orders could be enforced.

4. That such orders (reasonably made) do not take private property for public use, or impair property or business, in any such sense as gives a right of compensation or of trial by jury.

5. That the courts have no right to ignore the action of the Board whether by ordinance or order, and to enjoin the action of the Board without the record of its action being before the court for review, and that before the action of the Board can be set aside it must be made to appear that it exceeded its discretionary jurisdiction or abused it through recklessness, bad faith, or for other indefensible reason.

6. That the action of the Board, both by order and by ordinance, against slaughtering and cattle driving in densely populated portions of the city of New York, was in all respects legal and proper, and it was sustained by the decision of the Court of Appeals in each of the four cases carried to that court.

Thus it will be seen that while the Board is declared to possess adequate powers for the important purposes for which it was created, it is at the same time subject to that species of judicial supervision which will be a protection against every attempt to exercise unwarranted authority."

The method of dealing with nuisances is thus detailed in the same report, page 158:

"Since my last report, and especially since the decision of the Court of Appeals, the Board has adopted to a much greater extent than previously, the policy of abating nuisances by means of suits in the courts to recover penalties for violations of the law, or of its order or ordinances. This policy has been found most successful. Owners of real estate, previously in many

s, neglected the orders of the Board, and allowed it to do the
k commanded, while now a suit promptly brought for the re-
ery of a penalty, stirs such persons to immediate action.
) enforcement of the provisions of the "Tenement House
v," so called, is by that law made to depend entirely upon
s for penalties.

'he course which has now been adopted as to violations of
) law is as follows: When the report of an inspector is re-
ved, showing a violation, it is at once laid before the Board,
l a direction to commence a suit is obtained. Notice of this
; is then given to the owner or lessee, and he is allowed fif-
1 days in which to remedy the evil complained of. If more
.e is needed it is granted on application. If at the end of the
.e it is found that the evil has not been remedied, an action is
once commenced in one of the District Courts. The judg-
nt is always one hundred dollars, but in practice, the amount
en varies greatly with the circumstances of each case. At
t, many suits were discontinued without any judgment, as
n as the law was complied with. Subsequently the rule
) made to require the payment of costs, and now the ordinary
'ment demanded in each case is thirty dollars. This seems
)ugh to enforce obedience to the law, while it is not oppressive.
n at least three quarters of the cases the evils are now
ıedied without suit. No case is settled unless the remedy is
)lied. The number of cases under the "Tenement House
w," in which suits have been ordered within the year, is 3,339
New York, and 417 in Brooklyn. The number actually
)ught is 979, of these 741 have been disposed of and 185 are
v pending."

From the report for 1874-5, it appears that during the
iod extending from April 1, 1874, to January 1, 1876, 5,218
ts were commenced by direction of the Board for non-com-
ınce with orders of the Board, and for violation of the san-
'y code.

'he result is thus stated by W. P. Prentice, Esq., Attorney
l Counsel of the Board, in his report to the Board of Health:

In nearly all of these proceedings in behalf of the Board the
endants have called in person or by attorney at this office,
l entered into proper stipulations to abate the nuisance
ıplained of or rendered necessary explanations. As far as

practicable a liberal method of adjustment of these actions has been applied, the chief aim having been to secure the removal of the cause of complaint without undue hardship to the responsible party. As a result of this policy the owners of property respect the authority and will of the Board, as expressed in the orders entered from week to week, for the abatement of the various nuisances constantly accruing in this city.

Judge Woodruff, of the New York Court of Appeals, used the following language in regard to this Board:

"The importance of sustaining that Board, in all lawful measures, tending to secure or promote the health of the city, should make us cautious in declaring any curtailment of their authority, except upon clear grounds. On the contrary, powers conferred for so greatly needed and most useful purposes, should receive a liberal construction for the advancement of the ends for which they were bestowed."

THE METHOD OF DEALING WITH NUISANCES.

At the outset it may be remarked that the courts have sustained the rights of individuals to abate a nuisance, as in the case of Meeker vs. VanRensselaer, a New York case reported in 15 Wendell, p 397. In this case, the defendant, during the prevalence of the Asiatic Cholera, acting under an ordinance of the city of Albany, tore down a tenement house in the ward in which he resided, that belonged to the plaintiff, which was filled with families of poor people who allowed the house to remain in a filthy condition, which endangered the health of the city, and who neglected to clean the house or to remove therefrom, after notice to do so. The court, in passing upon the question of the defendant's liability, held that he was justified in his act, by the extraordinary emergency, but not as an official of the city, but as a citizen of this city interested in the maintenance of its health, particularly in the ward in which he resided.

Substantially the same doctrine is held in Manhattan county, vs. VanKeuren, a case in this State reported in 23 New Jersey equity reports, p 255.

The difficulty with such action is that the party thus taking the law in his own hands takes upon himself the risk that the thing which he attempts to abate may not be a nuisance in the eye

the law, and of course if he errs in judgment he would be ble.

As has already been intimated, the subject of dealing with isances gives rise to questions of great difficulty and delicacy. n a Board of Health proceed to abate a nuisance if, in their lgment, the public health requires such action? Can a Board Health adjudge something to be a nuisance and then proceed remove it, or must action be delayed until a judicial tribunal s passed on the thing complained of, and declares it to be, in e eye of the law, a nuisance? In other words, can the Legis- ure constitute Boards of Health with such powers and modes procedure that they can determine the question of nuisance d lawfully proceed to abate a nuisance if they decide that it ually exists?

In any event it may be promised that the Courts will keep h Boards within the powers actually conferred and to the de of procedure prescribed.

In Weil vs. Ricord 9, C. E. Green, page 169, a case arising out the action of the Board of Health in Newark, in this State, Court of Chancery restrained that Board from prohibiting tain parties from carrying on the tanning business, but left Board free to compel these parties to carry on the business, such a manner, that the same should not be injurious. But regard to the main question, which is comparatively a new , and does not appear to have been passed on in many States, far as I have examined, a different ruling has been made in ferent States. In New York and Pennsylvania, the action of alth Boards in deciding upon the question of nuisance, has n sustained. In this State, a different view has been held. I er to the case of the city of Camden vs. Hutton, reported in room, page 122 in which the Court of Errors took strong unds against the decision of Health Boards as to nuisances ding such decisions to be of no force or effect. See, however, portant opinions in the Supreme Court on Sanitary Laws and hts in case of Marshall vs. City of Trenton, 6 Vroom, page ; also, in case Matter of Drainage along Pequest River, 10 om, 434; see also case of Weil vs. Ricord 9, C. E. Green, 173. here would seem, however, to be no valid objection to invest- Health Boards with powers such I shall name. I offer these gestions as a plan by which efficient work may be done in the

direction of abating nuisances, in a manner not amenable to o jections based on fundamental principles:

1. Boards of Health should have power to enact a sanit code, declaring what things are or may become nuisances injurious to the public health, and prescribing penalties the violation of this code. Probably such code should be vised by the State Board, The Board should have power to sue these penalties in courts of competent jurisdiction. This pl would appear to have worked well, as shown by the experie of the Metropolitan Board of Health of New York.

2. Boards of Health should at least have power to regulate manner of carrying on certain noxious trades, and enforcing su regulations.

3. Boards of Health should have power in case of emerge cies, where in their judgment the public health may require after notice to the parties complained of, to declare a nuisan and to restrain parties from maintaining it until such time as court shall have decided the alleged nuisance not to be one fact; in other words there should be an appeal to a compet court from such action of the Board of Health and prompt a speedy trials should be afforded. Such is the law in Massach setts. The action of a Health Board, under this law was su tained in the courts of that State in the case of Belcher Farran & Allen, 328.

4. As no one has a right to maintain a nuisance, there can b no objection to permitting a Board of Health to show in cou in an action to collect the expenses of abating a nuisance, th their action was justifiable, and that they had actually abat a nuisance.

I apprehend that the cases are not numerous in which th emergency is so great as to require the abatement of a nuisanc without allowing time for sufficient notice to be given to th party maintaining the same. If means could be devised b which the question of nuisance could be speedily determined b a judge and jury, then individual rights would be protecte and the public welfare promoted. Such methods form an el ment in the English system.

There is a distinction between regulating the manner of using property and destroying property.

I apprehend that it is competent for a Health Board to make

asonable regulations in regard to the use of property in a nitary point of view and to enforce such regulations, while it ght not be competent for such a Board to destroy property. r instance, the trade in gunpowder, fire works and other nbustibles is a proper subject of regulation in regard to the alities in which it should be carried on, the amount to be kept storage, &c.

It would seem that a Board acting within the scope of reasonle regulations could enforce the same.

If they went outside of such reasonable regulations they ght become liable.

In the presence of epidemic and contagious diseases the omptest action is sometimes required.

Under such circumstances a Board of Health, which took the cessary steps to protect the public health, would run very le risk of legal proceedings. A police officer, who oversteps s duty by arresting an unoffending citizen, renders himself ble for an action for damages for false imprisonment. But is very rare that an officer who performs his duties intellintly is troubled in this manner. The authorities of a city may move an obstruction, even a part of a building, which enaches on a street or sidewalk. If they should go on the ounds of a citizen and remove part of his dwelling, they would nder themselves liable.

The same rule would apply to a Board of Health. They must t intelligently and be sure of their position before they pro-ed. It would seem also that the period of limitation within hich actions must be brought against officers acting in public apacity for the public welfare, should be a very short one.

CONCLUSION.

In conclusion I remark that the great benefits arising from the forcement of wise sanitary regulations are susceptible of demstration. The records of sanitary work in England show that the enforcement of sanitary measures the death rate has been gely diminished, not only in the larger and more populous wns and cities, but also in small towns and villages.

Says Dr. Harris: "The greatest necessities and rewards for sanry care and preventive measures, are more conspicuously witsed in childhood than in later life. It is now practicable to

point out the local conditions and social circumstances out of which more than twenty-five in every one hundred who die might be saved to riper and more useful years of life, under the influence of improved hygienic conditions."

Sanitary science proceeds on the principle that much of the sickness and disease which affects mankind is preventible, or, in other words, is due to certain conditions which produce them and which are removable. It is the province of wise legislation to enact laws which shall guard against, and as far as possible remove such conditions, and to put into practical effect the lessons which sanitary sciences teaches.

The results of practical sanitary measures are not alone found in the reduction of the death rate. The same causes which tend to reduce the death rate operate in much larger measure to reduce the sick list. In the words of another, "The gain to the common stock of healthy and vigorous life, in a population, is twenty-fold greater than the few added years of worldly comfort and usefulness that are represented by the number of persons at given ages, saved from premature death."

METEOROLOGICAL TABLES.

SUMMARY OF OBSERVATIONS OF W. A. WHITEHEAD, NEWARK, N. J.

FROM JULY 1ST, 1878, TO JULY 1ST, 1879, INCLUSIVE.

nimum, Maximum and Mean Temperature of each month deduced from full observations of the year ending June 31st, 1879.

MONTHS.	Date.	Minimum.	Date.	Maximum.	Mean.
1878.					
.....	23	60.50	3	98.25	78.25
ust	26	55.00	9	90.50	73.09
ember.....	28	43.75	1	88.00	67.47
ber.....	29	35.00	2	86.75	56.41
ember.....	15	27.00	12	58.00	42.65
mber	25	13.50	2	57.75	31.83
1879.					
uary.....	3	2.00	28	46.75	25.69
ruary.....	15	10.50	28	49.75	27.68
ch.....	1	16.50	10	63.00	38.42
il.....	6	24.50	30	76.25	47.96
.....	3	37.75	31	86.75	63.83
e.....	7	48.00	1	93.00	71.55
Mean average year.....					52.07

From July 1st to December 1st, 1879.

MONTHS.	Date.	Minimum.	Date.	Maximum.	Mean.
.....	20	58.00	16	99.25	75.36
ust	11	54.00	2	93.00	71.75
ember.....	26	38.75	1	86.75	62.45
ber.....	26	26.50	3	82.00	59.36
mber.....	21	17.00	12	71.00	41.76
mber.....	—	11.50	—	59.00	35.00

Minimum Pressure of Barometer Monthly, from two observations daily, during the year ending June 30th, 1879.

1878.	
July	
August	
September	
October	
November	
December	
1879.	
January	
February	
March	
April	
May	
June	
Mean average year	

From July 1st, 1879, to December 31st, 1879.

July	
August	
September	
October	
November	
December	

Number of Inches of Snow and Amount of Rain and Melted Snow falling each Month, from July 1st, 1878, to June 30th, 1879.

MONTHS.	Inches Snow.	Inches Rain & Melted Snow.
1878.		
July		
August		
September		
October		
November		
December	4.25	
1879.		
January	17.75	
February	1.01	
March	1.75	
April		
May		
June		
Total	24.76	

From July 1st to December 31st, 1879.

MONTHS.	Inches Snow.	Inches Rain & Melted Snow.
July		
August		
September		
October		
November		
December		

ean Temperature at Princeton for 1879. *From mean of three observations.*

February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
.....	.....	.....	.....	.....	64.75	76.25	72.00	65.9	29.9	28.7
.....	.....	.....	.....	.....	73.00	78.25	76 75	60.0	35.5	37.0
.....	.....	.....	.....	.....	77.50	81.25	71.75	68.1	29.7	44.4
.....	.....	.....	.....	.....	77.25	74.00	72.00	58.4	24.5	48.0
.....	.....	.....	.....	.....	64.37	78.00	70.50	61.6	28.6	38.2
.....	.....	.....	.....	.....	68.12	77.25	65.75	61.4	32.8	50.4
.....	.....	.....	.....	.....	68.75	70.25	70.5	60.2	35.0	43.9
.....	.....	.....	.....	.....	72.50	73.25	61.0	62.9	44.6	41.7
.....	.....	.....	.....	.....	73.30	61.25	58.0	69.0	59.4	38.4
.....	.....	.....	.....	.....	73 62	65.00	57.9	65.2	51.5	51.2
.....	.....	.....	.....	.....	78.87	72.75	57.5	61.2	46.7	45.7
.....	.....	.....	.....	.....	71.50	70.00	57.0	61.0	60.9	29.1
.....	.....	.....	.....	.....	79.25	73.50	61.7	64.5	53.6	25.2
.....	.....	.....	.....	.....	75.12	74.00	54.9	55.2	57.2	37.0
.....	.....	.....	.....	.....	80.25	70.00	56.1	63.7	61.7	36.0
.....	.....	.....	.....	.....	80.25	65.25	58.7	67.0	42.7	25.9
.....	.....	.....	.....	.....	74.37	71.25	57.4	60.1	40.2	33.5
.....	.....	.....	.....	.....	70.50	64.50	58.5	67.1	38.5	21.5
.....	.....	.....	.....	.....	69.50	68.25	58.5	49.6	28.6	26.9
.....	.....	.....	.....	.....	67.62	67.50	55.5	43.2	23.0	32.2
.....	.....	.....	.....	.....	76.12	70.20	54.5	50.6	16.4	14.9
.....	.....	.....	.....	.....	78.25	74.20	53.0	59.1	23.0	28.1
.....	.....	.....	.....	.....	75.37	73.00	59.5	58.9	35.4	29.6
.....	.....	.....	.....	.....	73.62	71.50	54.0	38.0	27.4	33.7
.....	.....	.....	.....	.....	72.00	61.75	42.6	30.5	33.1	20.0
.....	.....	.....	.....	.....	69.50	62.50	46.9	36.0	30.9	9.9
.....	.....	.....	.....	.....	75.87	61.00	48.5	41.1	37.9	18.6
.....	.....	.....	.....	.....	78.37	65.00	55.7	42.6	52.7	28.5
.....	.....	.....	.....	.....	76 87	68.75	56.9	46.7	35.9	36.0
.....	.....	.....	.....	.....	75.25	70.50	62.4	46.6	23.2	32.7
.....	.....	.....	.....	.....	76.12	70.75	.....	36.2	.....	21.4
.....	.....	.....	.....	.....	73.80	74.16	*56 55	55.54	37.94	32.77
.....	.....	.....	.....	.....	94.00	90 00	81.5	83.5	72.0	59.5
.....	.....	.....	.....	.....	57.00	52.00	35.0	21.5	9.5	4.5

*wenty-four days only. The omitted days were much hotter the mean. Mean of thirty days, completed from another record, 59.73.

No. 2—Maximum, Minimum and Mean Temperature, with S
Recording Thermometers—Station, Princeton, New Jersey.

DAY OF MONTH.	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEM
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
1	83	59	85	68	81	64	71	55	50	29	38
2	80	58	86	70	78	62	80	57	49	25	41
3	84	64	88	70	83	65	80	60	46	32	48
4	89	68	90	70	83	65	81	54	41	23	54
5	92	64	90	67	74	65	81	48	40	20	62
6	74	57	96	69	81	55	70	47	40	25	46
7	79	58	85	70	78	58	80	57	40	30	50
8	81	62	75	65	75	65	70	50	48	31	58
9	84	65	78	62	81	53	71	56	55	36	56
10	85	64	70	54	77	51	81	64	62	47	46
11	87	68	74	52	72	52	78	60	70	49	60
12	88	67	77	60	70	51	68	60	53	46	63
13	87	63	81	72	71	57	70	53	71	50	42
14	83	66	80	64	72	53	78	50	67	48	61
15	86	65	83	64	74	40	70	52	63	50	45
16	93	72	83	63	57	52	76	55	73	47	47
17	94	70	82	62	68	50	80	55	64	36	39
18	85	60	74	41	71	58	81	59	55	38	41
19	83	69	70	58	70	43	80	58	47	29	35
20	80	59	75	59	60	59	79	59	41	29	34
21	80	57	78	60	60	43	66	37	37	15	28
22	83	55	85	64	62	59	68	36	29	14	25
23	86	57	83	68	65	52	65	56	35	19	34
24	86	67	85	67	71	55	70	40	47	23	38
25	83	66	75	64	68	48	55	29	42	25	40
26	80	63	72	57	68	50	53	28	46	25	40
27	75	62	68	59	68	50	59	35	45	28	43
28	83	67	73	53	68	50	54	38	47	28	29
29	86	70	73	57	54	49	60	42	60	45	38
30	86	70	79	59	80	57	61	43	45	28	42
31	81	68	81	64							50
Range	35°		56°		41°		54°		60°		57°
Mt'ly means	74°1.		71°		63°		60°.5		41°.3		39°.6

No. 3—Barometer reduced to 32° F., Princeton, 1879.

January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
							29.742		29.902	30.083	30.156
							29.464		29.960	29.932	29.952
						29.823	29.707		29.786	29.724	29.877
						29.860	29.651		29.903	30.011	30.003
						30.0920	29.612		29.852	29.217	30.125
						30.082	29.591		29.900	30.014	29.642
						29.520	29.651	29.758	30.103	30.110	29.652
						29.507	29.310	29.645	29.979	30.130	29.913
						29.551	29.694	29.823	29.825	29.983	30.189
						29.420	29.710	30.002	29.900	30.004	29.903
						29.365	29.820	30.070	30.040	29.930	29.920
						29.400	29.950	29.965	29.944	29.605	29.991
						29.708	29.854	29.782	29.913	29.815	30.375
						29.744	29.610	29.722	29.933	29.804	29.873
						29.716	29.775	29.901	29.874	29.434	29.500
						29.581	29.681	29.688	29.857	29.770	29.825
						29.590	29.641	29.730	29.871	30.052	29.812
						29.307	29.586	29.905	29.726	29.652	30.120
						30.014	29.733	29.961	29.807	29.707	30.037
						30.022	30.891	30.054	30.007	29.940	29.812
							29.870	30.116	29.994	29.912	30.221
						29.736	29.641	29.951	29.896	30.011	29.822
						29.546	29.522	29.837	29.697	29.727	30.162
						29.661	29.378	29.744	29.980	30.068	29.821
						29.757	29.515	30.014	30.434	29.914	29.700
						29.600	29.699	30.150	30.424	30.261	29.956
						29.958	29.766	30.150	29.983	30.112	30.006
						29.713	29.849	30.072	29.991	29.722	29.946
						29.715	29.777	30.074	29.421	29.700	29.732
						29.809	29.748	30.048	29.545	30.241	29.951
						29.933	29.747		29.879		30.083
						29.703	29.667	29.923	29.900	29.808	29.929
						30.025	30.081	30.202	30.539	30.369	30.387
						29.307	29.664	29.608	29.289	29.210	29.113

No. 4—Inches of Rain or Melted Snow, 1879—Princeton, N. J

Days.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1												
2											0.177	
3												
4							0.84	0.84				
5												
6											0.357	1.1
7									0.170			
8							0.36	1.40	0.167			
9										0.700	0.040	
10												0.(
11											0.010	0.2
12												
13												
14									1.150		0.030	1.(
15												
16								5.28				
17												
18											0.725	
19										0.130		0.1
20												
21										0.047		
22									0.020	0.050		1.1
23								2.55				
24							0.36		0.023			0.8
25												0.5
26							4.18					
27												
28										0.104	0.770	
29											0.040	
30												0.1
31												0.2
Totals							5.74	10.07	1.530	1.031	2.149	3.7

No. 5.—Directions of Wind at Princeton, 1879.

JULY.		AUGUST.			SEPTEMBER.		
2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.
N. 2	S. 1	S. W.	S. W.	S. W.	.....	.....	.....
S. W. 1	S. W. 1	S. W.	S. S.	S. W.	.....	.....	.....
S. W. 1	S. W. 1	S. W.	S. W.	S. W.	.....	.....	.....
S. W. 2	S. W. 2	S.	S.	N.	.....	.....	.....
S. W. 2	N. E. 1	E.	E.	E.	.....	.....	.....
S. 1	N. 1	S. E.	S. E.	E.	.....	E. 1	0
S. W. 2	S. W. 2	S. W.	S.	S. W.	0	S. S. W. 2	S. W. 1
N. W. 2	N. E. 1	E.	E.	N.	S. W. 2	W. 3	W. 1
S. 1	N. 1	E.	S.	S.	W. N. W. 2	N. W. 1	W. 1
S. W. 1	S. 1	N. E.	N. E.	S.	N. W. 1	N. 2	0
S. 1	S. W. 1	N. E.	S.	S.	N. N. E. 1	N. E. 2	N. $\frac{1}{2}$
N. 1	N. 1	S. S.	W.	S. W.	N. E. 1	N. E. 2	N. $\frac{1}{2}$
S. 1	S. 1	S. E.	S.	W.	S. E. 2	S. E. 2	S. E. 2
S. W. 1	S. 1	S. W.	S. W.	S. W.	W. 1	S. W. 2	W. 1
S. W.	S. W.	W.	S.	S. W.	W. 1	S. S. W. 2	S. $\frac{1}{2}$
S. W.	N. W.	S.	S. W.	S. W.	N. E. 2	S. S. W. 1	S. 1
S. W.	S. W.	E.	N. E.	N. E.	S. S. W. 3	W. 4	S. W. 1
S. W.	S. W.	S. W.	S. W.	W.	W. S. W. 2	W. S. W. 2	S. 2
E. 1	N. 1	S. E.	S. E.	N. E.	N. W. 2	N. 1	0
N. W. 1	N. 1	S. E.	S. W.	S. W.	N. E. 2	N. 2	N. 1
S. 1	S. W. 1	N. E.	N. E.	S. E.	N. E. 3	N. E. 3	N. E. 3
W. 1	E. 2	S. W.	W.	S. W.	N. E. 3	N. E. 3	0
N.	S. W.	S. W.	S.	S.	N. W. 1	S. W. 3	S. W. 1
N.	N.	S. W.	E.	N. E.	S. S. W. 3	N. N. W. 3	N. W. 3
S. E.	N. E. 2	N. E.	N.	S. E.	N. 1	N. N. W. 3	0
E. 2	N. E.	N.	N. E.	N. E.	N. E. 1	S. E. 1	0
N. E. 1	S. W.	N. E.	N. E.	N. E.	S. E. 1	S. W. 2	0
S. W.	S. W.	N. E.	N.	S. E.	N. E. 1	S. W. 2	S. E. 2
N.	N.	S. W.	N.	N.	0	S. W. 2	(?) 1
S. W.	S. W.	N. E.	S. E.	S.	S. W. 1	S. W. 2	S. W. 2
S.	S.	N.	E.	E.	.....	.....	.....

No. 5.—(Concluded.)

OCTOBER.		NOVEMBER.			DECEMBER.		
2 P. M.	4 P. M.	7 A. M.	2 P. M.	4 P. M.	7 A. M.	2 P. M.	9 P. M.
W. N. W. 2	W. 1	W. 2	.....	0	W. S. W. 1	S. 2	S. 2
S. E. 1	S. E. 1	0	S. E. 1	S. E. 2	W. S. W. 2	S. W. 1	S. W. 1
W. 3	W. 3	W. 3	W. 4	W. 4	S. S. W. 1	S. W. 2	S. 2
.....	0	W. N. W. 2	N. W. 3	N. W. 2	W. S. W. 2	N. 3	N. 2
W. 2	W. 1	0	N. W. 2	N. W. 2	N. E. 3	E. N. E. 3	N. E. 3
E. 3	E. 3	E. 2	N. 2	0	N. E. 4	.....	S. E. 4
W. S. W. 1	0	N. 1	N.	N. 1	N. N. W. 3	W. S. W. 3	W. 2
S. W. 3	0	0	S. W. 2	0	Calm.	E. N. E. 3	N. E. 2
S. W. 1	S.	S. W. 1	S. W. 1	S. W. 3	N. E. 3	E. N. E. 3	S. E. 3
S. E. 2	E. 2	S. W. 2	N. W. 3	0	E. N. E. 2	S. E. 3	S. E. 2
.....	0	N. E.	E. N. E.	0	S. W. 3	N. W. 3	N. W. 1
W. S. W. 3	W. 2	S. W. 2	S. W. 2	S. W. 2	N. W. 3	N. W. 3	N. W. 3
N. E. 2	N. E. 1	W. N. W. 3	.....	.....	N. E. 1	S. E. 2	E. 2
W. S. W. 3	0	.....	.....	.....	E. N. E. 4	N. N. E. 3	N. E. 1
N. W. 2	N. W. 1	.....	S. W. 4	W. 3	S. W. 2	W. N. W. 4	N. W. 3
N. W. 2	N. W. 1	W. 2	W. N. W. 5	0	N. W. 4	W. 3	0
S. 2	S. 2	W. S. W. 1	W. S. W. 1	0	S. W. 1	N. W. 3	0
W. 3	0	E. 2	N. 3	N. 3	S. E. 1	S. E. 2	S. E. 2
N. W. 4	N. W. 3	N. W. 3	W. S. W. 2	S. W. 1	N. E. 2	N. N. E. 3	N. E. 2
W. 2	0	W. N. W. 3	N. W. 5	N. W. 5	0	S. W. 1	S. W. 2
S. W. 2	0	N. W. 4	N. W. 4	0	N. 3	E. N. E. 3	N. E. 3
S. 1	0	0	.....	S. 2	N. N. E. 3	N. E. 1	N. E. 1
N. W. 3	W. 4	S. W. 2	W. S. W. 3	W. 5	N. 1	N. N. E. 1	N. E. 1
N. W. 4	.....	W. N. W. 3	N. W. 3	S. 2	N. 1	S. S. W. 2	S. S. W. 2
.....	0	S. 2	S. W. 3	W. 1	N. N. E. 2	N. 2	W. 3
S. W. 3	S. W. 2	N. W. 1	N. W. 2	N. 1	N. W. 2	W. 3	N. N. W. 3
S. W. 3	S. W. 1	N. N. E. 1	S. 2	S. W. 1	W. 3	S. W. 3	S. W. 2
N. W. 5	N. W. 3	S. S. W. 1	S. 3	S. E. 4	S. 2	S. W. 2	S. E. 1
W. S. W. 3	W. 1	N. W. 4	W. N. W. 5	W. N. W. 4	W. S. W. 1	S. W. 1	S. S. W. 1
N. W. 5	S. W. 2	W. N. W. 4	N. W. 4	0	S. W. 1	N. W. 3	N. 3
N. W. 4	N. W. 3	.....	.....	.....	N. E. 3	N. E. 1	N. W. 4

Summary of Observations by J. Ingram, M. D., at Vineland, N. J.

YEAR 1878 TO 1879.	TEMPERATURE.			MOISTURE.			BAROMETER.				WINDS FROM JULY 1878 TO JULY 1879.								
	Max.	Min.	Mean.	Hydrogen.	Rainy Days.	Rain.	Max.	Min.	Mean.	Range.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Total.
July	96	66	77.99	80	9	6.42	29.989	29.488	29.786	.501	6	13	3	18	7	33	0	13	93
August	92	57	73.16	82	10	8.46	30.020	29.551	29.780	.469	2	23	2	19	6	27	2	12	93
September	86	42	67.98	80	5	.69	30.294	29.520	29.985	.774	10	21	2	11	6	27	0	13	90
October	78	32	56.24	76	7	2.18	30.135	29.016	29.887	1.119	6	6	1	9	5	28	11	27	93
November	61	23	42.96	70	7	2.25	30.317	28.820	29.813	1.497	4	12	4	8	1	23	9	21	90
December	60	9	31.76	67	9	5.69	30.313	28.656	29.854	1.657	0	2	2	7	1	30	5	46	93
January	63	4	28.92	68	6	3.75	30.363	29.285	29.903	1.078	5	9	1	1	2	33	14	28	93
February	58	7	29.55	71	6	2.38	30.600	29.305	29.891	1.295	5	8	1	7	4	17	8	34	84
March	68	18	41.01	82	10	3.36	30.514	29.294	29.964	1.220	8	4	1	8	8	29	4	31	93
April	83	30	48.33	80	9	3.47	30.238	29.296	29.758	.942	9	4	2	8	8	18	7	35	90
May	92	46	63.39	74	4	.77	30.288	29.666	29.908	.622	6	8	4	15	5	39	0	16	93
June	94	44	73.29	78	9	4.90	30.091	29.358	29.851	.733	5	2	0	10	3	52	2	16	90
						44.32													
Means	77.6	31.1	52.88	76	7.5	3.7	30.263	29.271	29.861	.992	5.5	9.3	2.0	10.0	4.7	28.6	5.1	24.1	

No. 4.—Meteorological Report for 1879.

meter highest August 3d	95°
meter lowest January 3d	4° below 0

on ninety-four days; Snowed twenty-four times; nineteen thunder showers; fourteen fogs; thirty-8; hailed four times.
frost, September 26; first ice, October 29; first snow, October 24.
t of rain fallen:

	INCHES.
	2.70
	2.30
	5.05
	5.80
	1.50
	8.85
	4.31
	9.23
er	1.42
	0.47
er	2.13
r	6.42
	50.18

t of snow fallen:

	INCHES.
	12
r	10
er	2
r	7
	31

vets since.
ines since.

E. R. COOK,
Observer Chief Signal Service.

VITAL STATISTICS.

nited Acts Concerning the Registry and Returns of Marriages, Births and Deaths as now in force.

1. BE IT ENACTED *by the Senate and General Assembly of the ate of New Jersey*, That every minister of the gospel, justice of e peace, and other person having authority to solemnize marages, and the clerk or keeper of the minutes of every religious ciety in this State, before which any marriage shall be solemnd, shall transmit to the proper officer, as hereinafter designted, a certificate of every particular marriage solemnized bere him, within thirty days thereafter, which certificate shall ow the name, age, parentage, birthplace, occupation and resimce of the parties married, the time and place of the marriage, e condition of each of the parties, whether single or widowed, e name of the clergyman or magistrate officiating, and the mes and residences of the witnesses; any clergyman or magisate neglecting to send such certificate shall be liable to a penty of ten dollars.

2. *And be it enacted*, That it shall be the duty of the physician, idwife, or other person present at the birth of every child born, nd in case there be no physician or midwife present, it shall e the duty of the parent to report in writing to the proper ficer within thirty days thereafter the following particulars as r as known: the day of the month and year of the birth, the recise place of residence, the names of both parents, and the aiden name of the mother, the birthplace, residence and occuation of the parents, the sex and color of the child, and its ame, if it be named, also the name of the attending physician, nder a penalty of thirty dollars; *and it is also provided*, that any ssessor of a township at the time of his annual assessment, in se he finds any return of birth not made as herein provided, y fill out the certificate of the same on the usual blank signed

by himself as assessor and maked "special return," and said return shall be valid as record of the birth, but shall not excuse the attendant for neglect of return.

3. *And be it enacted*, That no sexton, undertaker or other person shall hereafter bury within this State, or bring into or remove from this State, the body of any deceased person, without having first received a permit from the proper authority of the county, city or township wherein such person may have died, and if so doing, said sexton, undertaker or other person shall be liable to a penalty of fifty dollars; *provided*, that in burying any deceased person who died in any township in this State outside of city limits, or county health board limits, the certificate of any regularly graduated physician of the township wherein the person died, shall be held by the sexton or undertaker as the only necessary burial permit, to be disposed of by him as hereinafter provided.

4. *And be it enacted*, That in case of any person dying within this State, it shall be the duty of the physician who may have attended him during his last illness, to furnish the undertaker, or any member of the family applying therefor, a certificate of the death of said person, which certificate shall show the name, age, sex, color, nativity, occupation, last place of residence, place of death and the cause of death, according to the best of his knowledge, and said certificate shall constitute all the necessary burial permit in any township of the State, outside of city or incorporated or county health board limits, and the undertaker shall, within five days after said burial, send the same, by mail or otherwise, to the assessor of the township in which the deceased died, under a penalty of fifty dollars, as herein provided; *and furthermore it is provided*, that any undertaker residing in an incorporated city or town may present the certificate of death, in case of any burial which he is superintending, to the city clerk or other proper officer of said city, and receive the usual permit as issued by it, on condition that said clerk shall at once transmit said certificate to the assessor of the township in which the person died, and in case there has been no physician in attendance, some member of the family, if there be any present, if not, any one present, shall notify a physician of the death at once, and the physician shall proceed to view the dead body and ascertain all the facts necessary, and, if satisfied of the cause of

ıth, grant the township certificate for burial, and, if not satis-
l, shall send at once for the county coroner, or county physi-
n, or justice of the peace, who shall take charge of the body
l investigate the same, and, if any person present at the death
any person shall refuse or neglect to comply with the require-
nts of this act, they shall be liable to a penalty of ten dollars,
l the physician shall receive one dollar for viewing a dead
ly and granting a burial certificate, provided said physician
ı not been in regular attendance on the deceased, if so, no
ra charge shall be made by said physician.

. *And be it enacted*, That in any case where, on account of
absence of the proper officer, or for any other sufficient rea-
, it may be impossible to obtain from said officer a permit
time for burial, it shall be lawful for any judge of the court
ommon pleas or any justice of the peace of the county in which
person died, on being satisfied as to the correctness of said
ificate, to issue a permit for burial in the following form:
being impossible to obtain a burial permit from the proper
cer on account of (here stating the reason) I hereby grant this
cial permit for the burial of ——— whose death has been
y certified to me;" the said judge or justice of the peace shall
once copy upon the back of said certificate the permit as
nted, and mail the same to the office of the Secretary of
te at Trenton, marked on the envelope "Burial Permit;" and
undertaker or other person on the receipt of said special per-
, shall pay to the said judge or justice, granting the same,
sum of fifteen cents.

. *And be it enacted*, That any person who shall knowingly
ke any false certificate, statement or receipt, relative to any
rriage, birth or death, under the action of this law, shall be
ged guilty of a misdemeanor, and on conviction shall be
nished by fine or imprisonment, or both, at the discretion of
court.

. *And be it enacted*, That the proper officer to receive the cer-
cates of marriages, births and deaths, and to grant permits
burial, shall, in any incorporated city or borough, be the city
rk or other officer charged with these duties, and in any
nty having a similar officer appointed by a county board of
lth now organized, be such person or persons as said incorp
ed city or county board of health has authorized or r

authorize, and in townships the assessor, but in townships outside of city or corporate, or county health board limits, the burial certificate given by any regularly graduated physician shall constitute the burial permit as herein provided.

8. *And be it enacted*, That it shall be the duty of all assessors, clerks and other officers to transmit, on or before the 15th day of each calendar month, to the Secretary of State at Trenton, in an envelope or package marked "vital statistics," all the certificates of marriages, births and deaths as above described, received during the preceding month, or at such other intervals or periods as may be designated by the Secretary of State.

9. *And be it enacted*, That it shall be the duty of such assessors, clerks and other officers, to make and keep a complete list, as far as possible, of all coroners, physicians, midwives, undertakers, clergymen and other persons authorized to solemnize marriages, and on or about the first day of May, in each year, to send to each a printed copy of the sections of this act defining their respective duties, and to furnish them, on application, with the proper blanks to make the prescribed returns.

10. *And be it enacted*, That such assessor, clerk or other officer, upon receiving a certificate from the Secretary of State as to the whole number of marriages, births and deaths returned as aforesaid, shall be entitled to receive from the collector of the township or other proper disbursing officer, ten cents for each marriage, birth or death so returned, the receipt for which shall be attached to the said certificate, and no payment shall be made unless such certificate be produced.

11. *And be it enacted*, That the Secretary of State shall appoint, on the nomination of the State Board of Health, of which he is a member, a suitable person, who shall be a practicing physician of at least ten years' standing, who shall receive the returns made in pursuance of this act, examine carefully and prepare, under the direction of the State Board of Health, such tabular statements, results and deductions therefrom as bear upon the population, the causes and sources of disease, and the sources of special progress and deterioration, and make an annual report thereof to the State Board of Health, which report shall be published as a part of the annual report of said Board; it shall also ane the duty of the said person to prepare and issue to assessors, ascerks and other officers the blank forms of certificates and re-

rns required by this law, and the printed sections of the law quired to be distributed to physicians, clergymen, undertakers, d other persons, and he shall accompany the same with such structions and explanations as may be necessary and useful, d shall do whatever may be required to carry into effect the ovisions of this act; the Secretary of State shall, as now thorized, furnish the above and other blank forms that may be quired for issue on application or otherwise, but the failure to ve received such blanks unless there has been application erefor, shall not be any excuse for the disregard of the law.

12. *And be it enacted*, That at the publication of the report of ital Statistics, the superintendent thereof shall have caused all turns of marriages, births and deaths for the year to which e report relates to be arranged and alphabetically indexed, eping each class of marriages, births and deaths distinct and parate, and also the index and returns for each county and for l cities of over five thousand inhabitants within said county; d the same shall be kept on file with the archives of the office the Secretary of State, and for the clerical service needed the mptroller is authorized to pay the same amount as is now ovided to be paid to county clerks for the same service, pay- le on the order of the Secretary of State; and in the case of y county now having a county board of health, or of any city over thirty thousand inhabitants, the clerk of said county or the city board shall also keep an indexed registry, and shall ceive from the proper authorities of said county or city an nount for each name so registered equal to that heretofore lowed for such index and registry.

13. *And be it enacted*, That the person appointed to take charge f the certificates of marriages, births and deaths, and to prepare e report on vital statistics, shall be paid for his services such m as may be fixed by the State Board of Health; *provided*, at he be paid out of the moneys appropriated for the use of id board; *and provided further*, that the entire amount to be pended by said board shall not exceed two thousand dollars nually, and so much of said amount as the Board of Health ay require shall be payable by the Comptroller on account ndered and signed by the president and secretary of the board, d approved by the Governor.

14. *And be it enacted*, That the State Board of Health shall have the same power of enquiry as to vital statistics, and as to other matters relating to public health in all cities and counties of the State having city or county boards of health as they have in other parts of the State; *provided*, that in no case shall the enquiries interfere with the present authority of city or county boards of health, nor shall the State Board of Health exercise any jurisdiction over such city or county boards.

15. *And be it enacted*, That in case any of the persons designated in this law to make or transmit returns shall fail so to do, they shall be liable at suit at common law to the amounts heretofore named, but said suit must be brought by a State, city or township board of health, or township committee in the State, and one-half of the amount recovered shall be paid to the usual disbursing officer of the city or township, and the rest shall belong to the board or committee bringing the action.

Explanations of parts of the Act as to Marriage, Birth and Death Returns.

Copy of sections of the law defining the duties of Clergymen, Coroners, Physicians, Midwives, Undertakers, etc.

1. BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey*, That every minister of the gospel, justice of peace, and other person having authority to solemnize marriages, and the clerk or keeper of the minutes of every religious society in this State, before which any marriage shall be solemnized, shall transmit to the proper officer, as hereinafter designated, a certificate of every particular marriage solemnized before him, within thirty days thereafter, which certificate shall show the name, age, parentage, birthplace, occupation and residence of the parties married, the time and place of the marriage, the condition of each of the parties, whether single or widowed, the name of the clergyman or magistrate officiating, and the names and residences of the witnesses; any clergyman or magistrate neglecting to send such certificate shall be liable to a penalty of ten dollars.

Neglect on the part of those solemnizing marriage to report e same, not only incurs the penalty, but often causes great in-nveniences in securing evidence as to questions of legal va-lity. It is the right of each married person to have this re-rded evidence, besides the need of these returns in the study of nditions, and of the moral as well as the civic welfere of so-ety. Those in charge of the various religious bodies at their an-ıal, semi-annual or quarterly meetings should not fail to cal tention to this duty of monthly report, and to the breach of w and ethics which the oversight involves.

2. *And be it enacted*, That it shall be the duty of the physician, idwife, or other person present at the birth of every child born, ıd in case there be no physician or midwife present, it shall be e duty of the parent to report in writing to the proper officer, thin thirty days thereafter, the following particulars, as far as ıown: The day of the month and year of the birth, the precise ace of residence, the names of both parents, and the maiden me of the mother, the birthplace, residence and occupation of e parents, the sex and color of the child, and its name, if it be med, also the name of the attending physician, under a pen-y of thirty dollars, *and it is also provided*, that any assessor of ownship at the time of his annual assessment, in case he finds y return of a birth not made as herein provided, may fill out e certificate of the same on the usual blank signed by himself, assessor, and marked "special return," and said return shall valid as a record of the birth, but shall not excuse the atten-nt for neglect of return.

The decisions of the medical profession (see English Registrar ıeral and Privy Council Reports and articles on Vital Statis-s, Vols. I. and II., Report of New Jersey State Board of ealth, and Transactions of Medical Society of New Jersey, 78,) authenticate it as a part of our duty to make these re-rts, besides the obligation which law and the general interests society imposes. If Physicians will carry a few blanks in the cket case or the visiting record, there is but little inconven-ıce. The fact that in townships the assessor is allowed to make ecial return in neglected cases will not be allowed to take the ıce of the requirement of return from the attendant, but it is ed as the means of informing the Bureau of Vital Statistics of

any cases of neglect of return. Assessors should inform those concerned of the penalty for such neglect.

3. *And be it enacted*, That no sexton, undertaker, or other person shall hereafter bury within this State, or bring into or remove from this State, the body of any deceased person, without having first received a permit from the proper authority of the county, city or township wherein such person may have died, and if so doing, said sexton, undertaker or other person shall be liable to a penalty of fifty dollars; *provided*, that in burying any deceased person who died in any township in this State outside of city limits, or county health board limits, the certificate of any regularly graduated physician of the township wherein the person died, shall be held by the sexton or undertaker as the only necessary burial permit, to be disposed of by him as hereinafter provided.

4. *And be it enacted*, That in case of any person dying within this State, it shall be the duty of the physician who may have attended him during his last illness, to furnish the undertaker or any member of the family applying therefor, a certificate of the death of said person, which certificate shall show the name, age, sex, color, nativity, occupation, last place of residence, place of death, and cause of death according to the best of his knowledge; and said certificate shall constitute all the necessary burial permit in any township of the State, outside of city or incorporated or county health board limits, and the undertaker shall, within five days after said burial, send the same, by mail or otherwise, to the assessor of the township in which the deceased died, under a penalty of fifty dollars, as herein provided; *and furthermore it is provided*, that any undertaker residing in an incorporated city or town may present the certificate of death, in case of any burial which he is superintending, to the city clerk or other proper officer of said city, and receive the usual permit as issued by it, on condition that said clerk shall at once transmit said certificate to the assessor of the township in which the person died, *and in case there has been no physician in attendance*, some member of the family, if there be any present, if not, any one present, shall notify a physician of the death at once, and the physician shall proceed to view the dead body and ascertain all the facts necessary, and, if satisfied of the cause of death, grant the township certificate for burial, and, if not satisfied, shall send at once for

.e county coroner, or county physician, or justice of the peace ho shall take charge of the body and investigate the same, and, any person present at the death of any person shall refuse or eglect to comply with the requirements of this act, they shall e liable to a penalty of ten dollars, and the physician shall re- ive one dollar for viewing a dead body and granting a burial ertificate, provided said physician has not been in regular at- ndance on the deceased, if so, no extra charge shall be made y said physician.

5. *And be it enacted*, That in any case where, on account of he absence of the proper officer, or for any other sufficient rea- on, it may be impossible to obtain from said officer a permit in ime for burial, it shall be lawful for any judge of the Court of Common Pleas or any justice of the peace of the county in hich the person died, on being satisfied as to the correctness of aid certificate, to issue a permit for burial in the following form: It being impossible to obtain a burial permit from the proper fficer, on account of (here stating the reason), I hereby grant his special permit for the burial of———,whose death has been luly certified to me;" the said judge or justice of the peace shall t once copy upon the back of said certificate the permit as ranted, and mail the same to the office of the Secretary of State t Trenton, marked on the envelope "Burial Permit;" and the ndertaker or other person on the receipt of said special permit hall pay to the said judge or justice, granting the same, the sum f fifteen cents.

6. *And be it enacted*, That any person who shall knowingly nake any false certificate, statement or receipt, relative to any narriage, birth or death, under the action of this law, shall be udged guilty of a misdemeanor, and on conviction, shall be unished by fine or imprisonment or both, at the discretion of he court.

7. *And be it enacted*, That the proper officer to receive the ertificates of marriages, births and deaths, and to grant permits or burial, shall, in any incorporated city or borough be the city lerk or other officer charged with these duties, and in any ounty having a similar officer appointed by a county board of ealth now organized, be such person or persons as said incor- orated city or county board of health has authorized or may uthorize, and in townships the assessor, but in townships out-

side of city or incorporate, or county health board limits, the burial certificate given by any regularly graduated physician shall constitute the burial permit as herein provided.

These sections are so explicit as only to need enforcement rather than explanation. The burial of a person in this State without certificate or permit, or the failure of a person in charge of a burial to return the same according to the city law or according to this law as provided in townships, is so hazardous that it is not likely to occur. There is only need to ask of physicians and others in making out certificates that they be as exact and full as possible in the statement of facts and that the returns of cause of death be such as the Leaflet to Physicians indicates. Such terms as general debility, dropsy, old age, sore throat, etc., are rarely defensible. On the other hand, cholera, typhus and typhoid fever, diphtheria, cerebro-spinal meningitis, should not be attached as names unless the specific character is clear.

In the interests of public health it is often well for the physician to state how prevalent the disease is at that time, if it is at all endemic or epidemic, and to note on the back of any certificate the prevalence of any disease which has been so mild as not to cause death. No physician should report a disease prevalent in his own practice unless he has had at least ten cases during the month.

In case of death, physicians will save undertakers trouble by leaving the certificate at the house of the deceased, or by having it ready at their own offices, so that it may be had when called for in their absence.

When in case of sudden death for which a physician finds he can not give certificate, a coroner or county physician, or a justice of the peace acting as coroner, is called, said officer gives the certificate of death as would the physician in other cases, and signs his official title.

NOTE TO CITY CLERKS AND ASSESSORS.

This copy of the printed sections of the act, etc., may be sent at any time by assessors or city clerks to any persons neglecting their duties under the law, or to any new physicians or ministers, etc., moving within their bounds. None, however, can plead

:e of the law from not having received such special
r. The names of physicians, ministers, undertakers,
required to make returns, should be kept by each
or city clerk in a small book, or we will, on request,
blank sheets for them. This Bureau should be notified
y as to changes of physicians and undertakers.
:ors and city clerks will send on the 15th of each month
ficates up to the 1st of the month, and place on the out-
he envelope, by number and initials, how many are sent,
compare accounts. When an Assessor goes out of office
ld include in his monthly return all certificates in hand
ime, together with the name and address of his successor.
ime of administering oaths to officers after the March
: varies from the middle of March to April, we close the
ar so soon as returns up to April 1st are received. All
f incorporated cities may have their receipt for returns
r year if they prefer.

CIRCULAR TO ASSESSORS, TOWN CLERKS, ETC.

important changes in the law as to the Registry of
es, Births and Deaths, make it necessary to issue
:ular.

ere has been no change in the law as to the return of
es. These are to be made to the assessor or city clerk in
ıship or city or borough where the marriage took place,
the forms provided, as they are for permanent preser-
In Hudson county all returns of Vital Statistics are
the County Board of Health.

here has been no change in the law as to return of
except that the penalty of non-report is increased to
ollars, and the assessor, in his annual assessment, is to
a certificate of birth, marked special in any case where
month has elapsed without report. This return names
ndant, and so shows where there has been neglect, but

does not excuse the attendant for non-report. Still-Birth
under the same provision. It is impossible to compu
meaning of the death rate unless studied by the side
birth rate. The law has been fully sustained, and a
now cautioned against the penalty for neglect.

III. The law as to the modes of giving and obt
Certificates of Death and Permits of Burial remains the
in cases of death within the corporate limits of any city
or borough of the State. When the death occurs i
township outside the corporate limits of a city or of a
Board of Health, the Certificate of Death of any reg
graduated physician answers as the Burial Permit; b
undertaker or person in charge of the burial must, u
penalty of fifty dollars, within five days of the date of
send the same, by mail or otherwise, to the assessor
township in which the deceased died.

Or if the undertaker himself resides in a city or incorp
town, he may present the certificate of death in *case*
burial he is superintending to the city clerk or other
officer of said city, and receive the usual permit as iss
the city clerk, whereupon the clerk at once for him tra
the certificate of death to the assessor of the towns
which the deceased died.

IV. Where a person who has died in a township out
a city is to be buried out of the State, it is best to ex
the Certificate of Death for the usual State or Transit
as we cannot compel other States to accept a Certificate of
as a permit. It is well for all assessors to have on hand
to exchange for Certificates of Death when asked. A
States accept *our* Transit Permit, and Pennsylvania acce
usual State Permit. The Certificate of Death is never
given up by the undertakers or persons in charge, to the
or keeper of a cemetery but where such have a registry,
may be taken, or a certificate marked "Duplicate" be le
the keeper of the cemetery. There may be special requir
of city ordinances where the burial is within the cor
limits of a city.

ases of disinterment and re-burial should be dealt with as ials, and have in cities a permit, and in townships a Phyan's Certificate, giving name and year or month of the ease.

V. Where a body is brought from another State for burial this State, outside of City or County Board limits, the Burial rtificate is the warrant for burial, but must be transmitted the undertaker within five days, to the assessor of the wnship in which the burial takes place, and if brought within y limits, must conform to the regulations for the city. If the dertaker resides out of the State, the law would hold the cton or other person in the State providing the place for rial as obligated to see that the certificate is duly sent. here a body is brought into the State without either Death rtificate or its own State Permit, the mode of procedure is the ne as where no physician has been in attendance.

VI. Where there has been no physician in attendance, "some mber of the family, if there be any present, if not any one sent, shall notify a physician of the death, and the physician ll proceed to view the dead body and ascertain all the facts essary, and, if satisfied of the cause of death, grant the tificate, and, if not satisfied, shall send at once for the county oner, or county physician, or justice of the peace, who shall e charge of the body and investigate the same, and, if y person present at the death of any person shall refuse neglect to comply with the requirements of this act, they ll be liable to a penalty of ten dollars, and the physician ll receive one dollar for viewing a dead body and granting Certificate, providing said physician has not been in regular endance on the deceased; if so, no extra charge shall be de by said physician."

In the case of a body brought from another State without rtificate of Death or Burial Permit, the charge of one dollar issuing the Certificate is to be paid by the undertaker or son in charge; where the person has died in the State, the sician who views the body and issues the Certificate, or rs the case to the coroner or county physician, is entitled to ive one dollar from the county collector, if he has not ived pay from the family or friends of the deceased.

VII. The allowance to those who receive and transmit certificates has been increased to ten cents. This includes the duty of transmitting such death certificates as belong to townships and have been given to city clerks to their respective assessors without remuneration. This increase of allowance is intended to result in a close oversight on the part of assessors and clerks for securing full returns. Success depends as much upon the officers as upon the facility of the law itself. It is not now meant that assessors and city clerks shall be merely receivers, but that they shall each in their way studiously aim that no marriage, birth or death shall occur without return in due form. Neglects reported to the Secretary's office will receive exact attention. It is the well determined policy of the State to make its statistics of reliable value both as records and as pointing out the social condition of the people and the cause of disease and death. The new law has operated encouragingly, but now that its inconvenient points have been adjusted and its force increased, there must be insistance upon exactness in all returns.

As the allowance for returns has been changed, accounts will be made up to date of April 1st. The receipts and orders for payment will be sent as promptly as returns are received in April, and the amount will be due on presentation to the disbursing officer of the cities or townships.

When there is any change of assessor or clerk the outgoing officer should make over all blanks, books of instructions, circulars, etc., on the day that he retires from office, and send us the name and post office address of his successor, whereupon the account due will be made out and sent within the month, instead of waiting until the close of the fiscal year. The new assessor or city clerk should at once inform us by postal how many blanks of each kind the former officer has made over, and how many more of each kind he thinks he needs.

VIII. While care should be taken that blanks be always on hand and are supplied to all, generally as done up in tens, yet clerks and assessors should see that the returns made nearly correspond in number with the blanks given out. In mailing, returns should be folded carefully, as they are kept on file. It is best, as far as possible, to send on the 15th of each month

ıly those of the previous month, except where an assessor is aking his last return. It is also best to mark on the outside of ıe envelope of each package the number sent, M., B., D. and B., showing the divisions of each.

IX. We have now a list of all Clergymen, Physicians, Undertkers, etc., in the State. City clerks and assessors will please ıport especially medical changes. They should compare their ɛturns at least every three months with their lists to know if ıere are any omissions of return. When any physician in full ractice has made no birth return for three months, the fact ıould be stated to this office. In April of each year, in accord ith section 9 of the law, all lists should be reviewed, and such otices as are needed be sent.

X. Hereafter applications for blanks should be sent by postal, irected "State Vital Statistics," Trenton. The book of inructions, or Leaflets, will be sent to Clergymen, Physicians, ndertakers, etc., on similar application by postal, or through ıe assessors and city clerks.

CIRCULAR.

TRENTON, N. J., 1878–9.

The enactment of a new State law as to the registry of Marages, Births and Deaths, affords a good opportunity to secure ɛeater accuracy of returns everywhere, and for cities to enforce ıeir own local requirements in addition. These records have ecome so important in furnishing information as to the progress f States, the condition of the people, and the needs of sanitary ıpervision, and so help to guard against careless dealing with ıe sick or dead, that all countries now insist upon their careful ollection and study. Ii is found that all such laws depend for ffective working very much upon the person who, in any city r district, superintends the returns. If he keeps the names of lergymen, Physicians, etc., and each month examines his reırns, he will soon be able to detect any failures of report. With ıe return made August 15th, 1878, all City Clerks are requested

to send a list of all practising Physicians or Midwives who live within the city limits, and all Assessors to furnish a similar list of such in their respective townships, with the post office address of each person. The list should, as far as possible, designate the sect of practice; those of the Old or so-called Allopathic School being marked (A), those of the Eclectic (E), those of the Homœopathic (H), and Midwives (M). We may thus know whether those signing their names to Birth and Death Certificates have somewhere received education or license.

The names and post office address of all *Undertakers* in your city or township are also desired. Returns made to the Secretary of State will be carefully compared, so as to find out any failures of duty, and cases of omissions be recorded for investigation. All Clerks and Assessors are requested to make prompt return on the fifteenth day of each month, and to report any case of Burial without Permit, or any other case of delinquency in their District, to the Secretary of State, Trenton, N. J., or to E. M. Hunt, M. D., as by his direction, having the oversight of State Vital Statistics.

CIRCULAR TO TOWN CLERKS AND ASSESSORS.

TRENTON, October, 1879.

The experience of the Bureau of Vital Statistics has now extended over a sufficient length of time to enable us to judge of the success of present methods, and the cause of variations that may occur in the completion of returns. Incidents connected with the change in the law, the small compensation at first allowed to assessors, and the inconvenience of the first law in rural districts, occasioned some embarrassment. But since the improvement made in the law by the last Legislature, these difficulties have vanished. The aggregate number of Marriage, Birth and Death returns for the year ending July 1st, 1879, is an increase of about 13,000 over the previous year. As we come to compare the fuller returns in the different districts, it is apparent that where assessors are faithful in reminding the tardy, and requiring from all compliance with the law, full returns are secured.

t will always occur that some are negligent in making their re-orts. It is now the duty of all assessors and town clerks, at least ach three months, to closely note those who fail to make returns, r whom they have reason to believe overlook some. When this s done full returns are obtained. In cases of continued derelic-ion, we have not failed in a single case reported to us to secure he returns. Already good effects are apparent in tracing the auses and localities of disease. It only needs faithfulness on the art of assessors to make this census of vital condition more com-plete than any other census which is taken. We now ask each assessor and town clerk to be diligent in securing returns, where here is any neglect, and to report to the Secretary of State and Bureau of Vital Statistics any persons who neglect their duty. The law is imperative and the duties explicit.

"Modern sanitary science owes its existence to the registration of deaths, and the localization thereby of unsanitary conditions." Alongside of it we need to study the marriage and birth returns as showing the proportion of material, the circumstances, ages nd conditions with which disease is dealing. No city or town-hip can properly guard its population or lessen the avoidable urdens of insalubrity which sicken and destroy its inhabitants ithout a study of such statistics. In large cities it is indispensa-le that street by street or other areas of locality be studied and ompared. The English reports teem with records of such in-uiries, and with the details of methods by which the people have een delivered from some of the most serious embarrassments to ealth and life. We urge each assessor and town clerk to re-tudy carefully the directions already given—to secure full reports rom each clergyman, physician, etc., and in a thorough, business way to aid us in the perfecting of these returns.

By order of Bureau of Vital Statistics.

CIRCULAR AS TO SANITARY ORGANIZATIONS IN CITIES.

To the Mayor and Common Council of your city:

New Jersey has about fifty incorporated towns and cities, in-luding over 600,000 inhabitants, the entire population of the State being a little over one million. Other towns not incorpo-

rated, such as Vineland, Flemington, Somerville, etc., contain about 50,000. According to the census of 1875 in an area of 70 square miles there are 307,363 inhabitants, or nearly one-third of the people of the State. The geographical position of our State necessitates that masses of people congregate in chosen centres. The relations of tide water also bring the cities in close neighborhood to each other. We cannot thus mass population without certain incidents and associations unfavorable to health and long life. The comparison of the average death rate of city and country, and that of cities among themselves, shows the actual facts as to the perils, and also how far they may be obviated or diminished by sanitary methods. There are no health lessons more valuable than such as are to be learned by the study of those English cities in which sanitary measures have sensibly prolonged the lives and improved the health of the people. Sickness and death are more expensive to towns and more personally depressing than are such expenditures as are really demanded for their prevention, if these are made with intelligent and honest jurisdiction. The greatest expense is generally in undoing what ought never to have been done, or in imperative changes after a locality has been builded upon. Many of our cities are now accumulating evils which wise forethought and a little expense would easily avoid, while afterthought and depressing disease and taxation will create the real burden. If before doing we find out just what needs to be done and how to do it, leaving the *when* as a measure to be decided on with all the facts in view, there is seldom unwise or burdensome expenditure. Cities will be disease resorts until they are made health resorts. The questions for the citizens and for their official representatives, are simply these:

What ought to be the health condition of the town?

What are its natural sources of ill-health?

What are its artificial sources?

How can these be prevented from increasing?

How can real evils be abated?

It is not difficult to obtain important preliminary information. In the inquiry itself good enough is done to pay for the time and trouble, even if we are not able at once to abate recognized evils. The first step toward reform is a sense of its necessity. We have sometimes to pause long, but nothing is lost by the

The State is helping in this direction through the Vital Statistics. It is now possible to learn what the th rate is, what proportion it bears to the birth rate, e population, what ages are most affected, and what es show their effects in registry of death and in the ɜ of disease at any one spot. The geology of our State ed that it is an easy matter to determine the ground ır cities. The sources of, and the risks from, impur- ıot difficult to discover. What constitutes a healthy nd what are the deviations therefrom to be found in ırts of them can be ascertained.

children or operatives are assembled for daily work, know whether there are avoidable evils risking health ıssing labor. The great present need of most of our ot expense, but some well devised steady inquiry—a ı of its importance, and some simple, definite plan of ing. Every city should have its Health Board of not ve members. These should not be chosen politically, reference to fitness for sanitary inquiry into the causes orably or unfavorafily affect the public health. The l City Physician should be, ex-officio, members of the ırveyors and City Clerks and School Trustees are often with other members. It is not difficult to select in hose who by judicious examination could give valu- nation as to local causes of disease. Some of our cities ealth Boards at all. In some there are Boards with-

cpenditures limited within fifty or a hundred dollars, ı Boards could gather facts which all the citizens ɔw, and which would prevent increase of sickness by s, where they could not at once abate nuisances. there a city is doing valuable work. We know a few hich voluntary associations have accomplished so) have been of great service.

alth Board of the State has, as one of its duties, to co- th all localities in such inquiries.

ɔectfully ask that you make of your Health Board more than a name, if at present it is merely this, and lace yourselves in such correspondence with us as that be mutual aid in securing the welfare of our citizens.

These interests have to do with the material prosperity of your city far more than some imagine. The time has come when intelligent persons, seeking settlement and business, inquire as to the sanitary administration of the place. The City Clerk in his next report of Vital Statistics is requested to send the names of the Mayor and of the Board of Health of the city, and always to send any report made by the Board or any facts as to sanitary conditions.

Any careful series of questions asked by any Boards will receive due attention from the State Board of Health and the Bureau of Vital Statistics. We ask that this matter be brought before your Council at its next meeting and that your Board of Health be so strengthened as to secure effective inquiry.

EZRA M. HUNT,

Secretary of State Board of Health, Medical Supt. of S. V. S.
TRENTON, N. J.

)RT OF THE MEDICAL SUPERINTENDENT OF STATE VITAL STATISTICS.

al Statistics are important because they are the record of ital conditions of population. They afford the data with ı we must be acquainted in order to plan for the future opment of the social and material resources of a State. If present facts not in accord with true progress or a higher zation, we are thereby led to inquire into causes of failure and dy how, in the future, to abate or control whatever may be to have interfered with the highest welfare of the whole e. Governments long since found that as preparative to ce in times of war, they must seek an accurate acquaint- with the physical conditions of their subjects. A standing , selecting the strongest men, and, by military discipline, de- ing all their physical resources, might seem, in part, to pre- the necessity of special care for the remainder. The Euro- nations have not so thought, and surely a nation depending y on a citizen soldiery could not so reason.

dern and Republican statesmanship has taken a higher and er view in that it has come to estimate the real strength of ople, by the capacity of a nation in peace; by the which it can infuse into trade, commerce and the arts, and effort to secure that endurance, of which a sustained in- y is the happy token. It affords a base of supply which prevents the occurrence of war, and, if it comes, gives the ssurance of victory. Social science is now distinctly recog- as an indispensable department of Political Economy. It o more important division than that which concerns the ı and the life of the people. The common health is so the common wealth as to restore to the two words their r identity of meaning.

ɜ sufficient for us just now to accept the united verdict of ıtists in favor of the most accurate registrations of those

events of marriage, birth and death which so concern national as well as individual life.

Our greater need is to study the best methods of securing the returns, and then how to deal with the facts acquired in such a manner as to deduce from them correct conclusions, such as shall indicate avoidable errors on the one hand, and true methods for progress on the other.

It is fortunate that we do not enter upon an untried or experimental field of inquiry. Statistical inquiries conducted by methods such as belong to science and the arts, have been pursued by many governments as parts of their economic administration, and have commanded the devoted attention of many of the ablest minds of the age. Speaking of one class of such records Farr, the statiscian says, "The deaths and causes of death are scientific facts which admit of numerical analysis. Science has nothing to offer more inviting than a study of the influence of civilization, occupation, locality, seasons and other physical agencies either in generating disease or producing death, or in improving the public health." After twenty-one years of registry, he says, "We have now before us the results of observations in a certain class of phenomena. They are as valuable as the experimental philosopher could have deduced from his experiments if he had had the power to expose the population to great vicissitudes of heat and cold, of dampness and dryness, to changes incidental to differences in the price of food; to air and water in different degrees of impurity, and to destructive epidemics." "Organized bodies are governed by laws as fixed as those which govern the stars in their courses."

Beneke, the statiscian of the German government, has said "mortality statistics are the basis of public as well as private care of health. Every step forward in this direction is a gain to human working-power and welfare." Our American statist, DeBow, generalized the accepted fact when he said: "The experience of all countries preserving such records shows a marked amelioration of society, diminution of disease, and extension of the average period of human life."

As to the method of obtaining the most correct returns on leading points, there is, on the part of those who have used various plans and had the largest experience, a unanimity of

udgment quite in contrast with the varied and speculative uggestions of those who have not studied this subject as they ave the details of their own chosen occupation.

First of all it is found that the record of an event is most ccurately obtained from the person specially in charge at the ime and at a period of time not remote from the occurrence. Punctual and careful men are apt to think that occasional eports in bulk would do, while those who lay chief stress on he fact of a marriage, or birth, or a death, rather than upon vital nquiries connected therewith, do not object to an annual ollector whose returns are capable of no satisfactory analysis.

Second, returns are chiefly of value when gathered over large reas and from a large population admitting of comparisons as o city and county, as to locality and climate, as to age and ircumstances, and other modifying or governing circumstances. It is only thus that hasty generalizations from an insufficient umber of facts are avoided, and errors eliminated, which, in a small comparison would be formidable or unaccountable. The general government now deems it wise to attempt this at its decennial census for the whole country.

When our present law commenced operation, it might be airly asked whether returns could be secured from the whole State with the same accuracy as from a single county, even hough it would be readily granted that if they could the comarisons would eventually be of far greater importance. Experence has fully settled this point. There has been little difficulty n securing the returns. Delays have occurred more in cities hat had become accustomed to neglect a local registry law, than n those that never had one, or than in sparse localities.

It will be seen that with all the temporary embarrassment conequent upon any change, and then upon a subsequent modificaion, the aggregate of returns exceeds by over 13,000 those of the ormer year.

New Jersey represents a population of little over a million, or bout the population of New York City. By the facilities of present postal intercourse we are easily able to bring together monthly returns, and in the end to secure all the advantages afforded by a comparison of all the returns for the whole State at a single centre. This affords a basis for the thorough study of ocial and vital conditions in every part, which will enable us in the

future not only to compare different counties and districts with each other, but also each city with every other. Our larger cities will need to make that closer inquiry which is thus made easy of comparing different streets and parts of its own municipality in order to find the operative causes of variable death rates.

The more difficult question to deal with at present is how to tabulate the statistics which are obtained so as to make them correct inferences.

Some of the most valuable deductions can only be made by comparisons of one year with another. As our former statistics have long been admitted as valueless for any sanitary or disease study we can only rely upon such as shall be soon furnished from year to year.

It is important at the start to settle definitely as to the use to be made of the figures and the kind of analysis which will be instructive.

As the returns of deaths and causes of death can be more informingly dealt with in the start, it is best for the present year chiefly to consider how we are to get indications for sanitary care and advisement from these.

1. The first apparent principle is that the proportion of deaths to the number living is an indication of the prevalent mortality of a people. It is also an approximate indication of the amount of sickness, and of the prevalent stamina of the population. To this general statement there are found to be some collateral limitations which need to be regarded in constructing life tables.

2. We need to deal with large areas and with smaller areas in various localities and of various density of population in order that our generalizations may be more accurate, that our comparisons may be more numerous, that our mode of dealing with variations in special localities may be fully certified. It is partly for this reason that not less than one thousand is usually taken as the unit for statement of death rate.

The aggregate of deaths and the aggregate of the living have fluctuations, which would lead to erroneous generalizations. Errors from this source can, to a very great degree, be avoided by dealing with decades or lesser divisions of age.

3. This leads to the proposition that tables of mortality must present the proportions of the death at each age to the living at

ıal age. The careful study of this subject by vital statis-
ans, both in reference to vital returns and the interests of life
urance has led to the conclusion that "the rate of mortality
decennial periods furnishes the most satisfactory basis for
ermining the series of facts which will express the probabil-
es of life. It is also usual to include all the ages under ten in
decennial period, making deaths under five a distinct column
addition.

It is also claimed by many that all deaths under one year
ould form a separate column, although others have shown
at in an aggregate, if included with all under five, they do not
sturb the reliable approximation to accuracy.

4. For the same reason it is important to know the number
the living at each of these ages and the number of births,
ıce only thus can we accurately know the amount of material
th which disease and death are having to deal. Where birth
urns are incomplete, the whole number living under one year
age added to those who have died under that age within the
ar, enables us to reckon as to the deficiency with an approxi-
ıtion that is safe in dealing with large numbers and extended
eas.

5. If we add together the ages of all who die and divide the
m by the number of deaths we get the *mean age at death.*
rmerly the health of two populations was supposed to be
licated by the mean life time, and this to be in the proportion
the mean age at death as thus shown. The mean age at
ath does bear upon the laws of longevity and race-conditions.
ıt in the light of the closer analysis afforded by finding the
oportions of death at different ages to corresponding ages of
pulation, and of the whole to the parts, it is evident that this
ethod alone is not reliable.

Another method of securing the mean age at death is ap-
oximate. It is illustrated thus: If one hundred thousand
rsons born at the same moment were followed through life,
e number that died in each year of age noted, and the sum
these ages divided by one hundred thousand, the average
es which they lived would be obtained. The mean duration
their lives would be their mean age at death.

If these were a fair sample of the law of life in their country or
ce of residence, this would give us the mean future life-time
those born at any successive period, or what is called "the

expectation of life." On such a basis life insurance and annuities can be predicated, and a standard furnished by wh to estimate the deviations occasioned by disturbing causes a the methods of their abatement. This idea is practicalized taking the population living at each age in the middle of a y (thus avoiding some fluctations which might appertain to a cent years,) and the deaths in the same year at the same a We thus obtain the actual mortality both as to number and a and the proportions, and so come to know the mean dura and expectation of life. At the same we possess ourselve details of data that help much in the study of the devitali burdens of population.

6. Another recognized principal as to vital statistics is some diseases and deaths at certain ages are far more info tory than others as to artificial and avoidable causes of dis The so-called zymotic diseases, for instance such as scarlet f diphtheria, etc., have, by analysis of facts as to the conditio their excessive prevalence, established for themselves indicative value as that Simon has associated them unde name of filth diseases.

The alvine fluxes such as diarrhœa, cholera infantum, and the lung diseases of early childhood are quite informa as to local surroundings. Thus an analysis of the liv 100,000 children born in one year, as actually made unde direction of the English Statistical Bureau, showed that 2 died within five years. "Closer inquiry showed that prevei depended very much upon the power of parents to supply and raiment, upon the mother's watchfulness and cleanli upon the air they are doomed to respire in imprisoned c and alleys, or in the fresh open atmosphere of healthy cou districts." Similar inquiries in subsequent decennial pe show the effects of school life, of trades, and of the va influences which either establish or undermine physical vig

We are thus able to ascertain to what degree life is shorte under unfavorable conditions, what these conditions are how they may be vacated.

"These items," says one, "are as indispensable in sani inquiries as the barometer or thermometer, or other instrum in physical research. The influence of any external caus combination of causes can be analyzed, while without this

d extended observation and calculation we are liable to be sled at every step by vague opinions, well concocted stories, interested statements." These are our instruments of pre-ision, without which we have not the data for reckoning by hich to determine fluctuation, and so guard against disturbing rces. It is because the State and society can not afford to be norant of such social conditions as are subject to ascertainable ws of progress or deterioration that studies like these touch ry nearly the polity of any people.

To those who merely view statistics from afar, or are bewil-ered over masses of figures—as they would be bewildered in printing office because they have not set type—there is a ten-ncy to conclude that there are so many sources of error that liable results cannot be obtained or safe deductions made erefrom.

There is no such wilderness as that of unexplored statistics, id no such confusion as that arising from the misplacement or -assortment of figures. On the other hand, there is no greater cidity than that of a problem mathematically demonstrated id certified by the application and experience of competent servers.

It ought to be quite sufficient that the students of vital and cial conditions who have based their studies on such methods ave established for themselves the fullest recognition and have come thereby indispensable to the nationalities in which they re citizens. The names of Halley, Finlaison, Farr, Graham, uintelet, Bertillon, Berg, Beneke, Walker, Snow, and many hers are not the names of statistical dreamers or visionary ex-erts, but of men whose services their respective governments ave gladly commended in the interests of the population.

Additional to this is the fact that the methods they have evised, and the results they have indicated have been made the asis of such economic administrations as have resulted in ap-reciating the welfare of the people.

Fifty years of actual experience has shown that Joshua Milne as right when he said: "Whether the population is stationary, creasing or decreasing, and whether such changes be produced procreation, mortality or migration, or by the joint operation any two or more of these causes, provided that the mode of ir operation be uniform, or nearly so, and not by sudden

starts, the law of mortality may be approached near eno any useful purpose by actual enumeration and the bills tality."

The men who have inclined to and pursued the stu not generally been men of diffuse inference, but rathe who rely upon mathematical deductions and subject the to the severest tests of experience.

Halley, the inventor of life tables, had as the test correctness that he was the first to accurately predict the of a comet. "He believed in the constancy of the nature and ventured from a knowledge of a part of a c a comet to predict the whole." Applying similar met study to facts and observations about human life, he co the possibility of defining its course and conduct, of st its variations, and thus brought the science of numbers upon the determination of health, disease and longevity. gave an introduction to those numerical methods which doing so much in teaching us how to deal with great va from ascertained health-standards. It is this that led Graham, the Registrar for England, to say "that much being thrown on the physical condition of the respectiv lations such as suggests many ways of diminishing the s and ameliorating the condition of the people, for the lon of a nation denotes more than it does in an indivic happier life—a life more exempt from sickness and in —a life of greater energy and industry, of greater exp and wisdom. We can thus read of sickness diminish formity banished, life saved—of victories over death a grave with as much enthusiasm as of victories over arr the field." "The deaths and the causes of death," said D in his first report, "are scientific facts which admit of nur analysis. Science has nothing to offer more inviting th laws of vitality, the variations of these laws in the two s different ages, the influences of occupation, locality, seaso other physical agencies either in generating disease, in death or improving the public health." The tendency to ing or loose inference on insufficient number of cases i common.

It is a great thing for any study, whether of physical social condition, when it attempts to substitute exactn

gue conjecture. All the more when the attempt at once veals laws and shows us the method by which we can elimi-te or offset errors. By enumerating the ages of population, e deaths at different periods, by comparison with birth or death gisters, by so associating different periods and different locali-s as to detect imperfect returns, by comparisons of life and ath and population tables, and by various applications of ex-rt methods of analyses, and methods of securing closeness of servation and collateral tests of accuracy, this study has ne to assume a definiteness which is thoroughly scientific d eminently practical. Imperfections in returns which mis-d or confuse a casual observer are duly weighed and allowed for by the systems in use. Like the long-discussed proposition Farr, as to specific population, or the relation of density to oximity, which has so recently been certified as correct by Dr. bertson and Prof. Tait, so have other reasonings of the vital tiscians stood the test of accuracy. The calculations of proba-lities gives mathematical result.

The causes of disease are drawn with precision, and graphic ethods are enabling us to compare and study results, and to st and correct possible errors where they might exist. In such study there are disturbing factors, which, as being on opposite les of the equation, balance each other.

No true student of such a science but that recognizes fallacies be guarded against, and elements of confusion in the initial forts at registry. But the mariner must not throw his compass rerboard because there is a real and sometimes unaccountable ctuation of the needle. In guiding human life amid its oals or deep waters, statistics afford us equally valuable and dispensable aids, although it is true they need a close supervis-n in order that accuracy and completeness may be secured.

Without now entering into all the details of methods by hich such a study is conducted, it is in order to say that our gistration system was not adopted without close inquiry into e plans of other States as well as of those of foreign govern-nts. It has already commanded the attention of experts in line of study and practice, and is so commended by those have examined it as to give great occasion for hopefulness. ere are lessons which can only be learned by actual erience and comparisons that can only be made at the

shortest, at quinquennial periods. But in the meanwhile the records will be valuable in all legal aspects, while in some regards we shall be able to study the comparative figures of each year, and of each city and county with great advantage.

We have no reason to apprehend any difficulty in securing reports from each township or city, and in increasing their accuracy and completeness. With those who have thus far had occasion to examine the returns for legal evidence, there is a uniform expression of satisfaction.

Our table of returns is made to reach from July 1st, to July 1st, of each succeeding year. For facility of comparison, it were better to have the report reach from January to January. But because this report must be made by the 1st of November, this is not feasible unless the report should only reach to the preceding January. It has been thought better, therefore to have it embrace a year which reaches to July 1st, and so is easily divisible into half year or quarterly estimates for purposes of comparison. The returns for June of 1878, as thus left out of the tabular classification, are all duly filed and indexed, and are given by counties and cities in a separate part of the report, and not included here in the summary for a year.

Guarding ourselves against arrangements of figures and deductions therefrom, or insufficient data, we shall, this year, need to deal only with a few tables. The tables will show the actual number of Marriages, Births and Deaths, as returned from each township and from each city of over five thousand inhabitants.

As occasionally returns were made by assessors over the line of their townships, which could not always be adjusted until greater familiarity with boundaries was acquired, there will be some slight variations in numbers, but none sufficient to be serious disturbing factors in the general estimate, and none that are not noted upon the original index sheets, as where burials from other States or reburials took place. Various tables as to marriages, showing ages, nativity, percentage to the population, occupation, etc., and similar items as to births, and comparisons with previous years, would not, if now made, be available for any practical purpose. They are on record and indexed so as to be easily consulted. The State has, as yet, made no provision for such full transcription of the returns as is desirable. Of these we at present give only the local numbers and general summary.

ost important table to be made at present is that which, after
ıg the number of deaths in each statistical district, then
the principal causes of death and the ages of the dece-
Thus we are enabled at once to study the influence of
:auses of disease, and to compare one locality and one part
e population with another at marked periods of age.
for some purposes it is advisable to study population in
uennial or decennial periods for the purpose of this com-
ɔn, we have taken the ages used for this purpose by the
ɜt European authority, and the same selection of diseases,
he addition of two or three incident to our national and
locality.

s hoped that ere long we will be able to deal thus with
disease at shorter periods of life, and with it to associate a
study of occupation, circumstances and modes of life.
ly some of the data of these tables are prepared. The
ıtion will be made to such a degree as the State Board of
h, under provisions of the State may direct.

lealing with the death returns, we have the satisfaction of
ng that we are able to give with great accuracy the actual
rate of each locality, with ages and other vital facts.

ile the statement of causes of death depend much upon
agnostic accuracy of the attendant in charge, and there is
just criticism as to the competency of some who furnish
cates, yet for the leading diseases the record is quite
ıte.

would be better too if the birth returns were as full in
rtion to the actual number as the death returns, since this
the relation between death and birth rates, and the
nt of susceptible material furnished for disease or for
itary impression. These will be more fully secured each
while the record of all deaths before 5 years of age and
ations, established as to the usual proportion of birth
to population will enable us to secure comparisons
aching to accuracy.

COMMENTS ON RETURNS.

twenty-one counties of the State by the census of 1875
ın 1,020,584 inhabitants.

ıge
ɔcted

The deaths as appears from the tabulation from July 1st, 1878, to July 1st, 1879, numbered 20,440. This is a death rate of 20.02 per 1000 for the whole State. Of these the large proportion of 7,919 were under five years of age, and of this number 4,452 under one year of age.

The still births are excluded from this summary. Of the remainder of the 20,440, 1,905 died at the ages from childhood to manhood, or from five to under twenty years of age; 5,930 from twenty to sixty years, or in the active working period of life; 4,337 beyond the age of sixty, and 349 at age unknown or not stated.

The returns or index sheets give all the ages so that they may be divided into quinquennial periods, but they are here published nearly as in the quarterly Glasgow summary. The published tables show the proportions for each county and township of the State for all cities over 5,000 inhabitants.

There are twenty-one incorporated cities of the State containing over 5,000 inhabitants, and these as required by law are indexed separately.

Out of the 1,020,584 inhabitants of the State these cities contain 486,541. Besides these many of the townships have their chief population in cities. Out of the 20,440 deaths in the State 11,208 have occurred in these cities.

The area of the whole State is 7,576.68 square miles.

The area of all the twenty-one cities is not yet available.

A study of other cities as related to area shows the great tendency of population to cluster and mass so that parts of some of these towns are so dense as some larger cities. A close examination of a few of these larger cities will show them so small and favorably situated as to be entitled to have only a county death-rate. So on the other hand outside of these cities there are found crowded villages, or ill-situated or ill-managed localities which have a city death-rate, and so make the average of the township large. In one or two instances the county death-rate is made large by this fact. That of Atlantic county is too large because of a defect in census and large temporary population. A careful and systematic comparison of these conditions will well repay medical practitioners, or those who may be studying the vital conditions of population in special local-

e death rate of each county is given, as also the death rate
:h city so that all these may be compared. The death rate
vnships is not carried out, because that is easily done as any
nay desire, and as the calculated death rate of small or
ɜ populations for a single year does not convey a proper
ate of real healthfulness. It is true also that in the case of
ies and of cities, while the aggregate death rate is informa-
ɔr indicative, it needs also to be carefully compared and all
fying circumstances duly weighed. Thus the general death
ɔf Hudson county, outside of its cities of over five thousand
ɔitants, is made to appear larger, because of the compara-
' small population outside of these cities, and because as
'bs, or by reason of special localities and exposures, there
nall areas which show a very high comparative death rate.
ɪ the death rate of Jersey City, in comparison with Hobo-
s really higher than the figures would indicate, since the
ɔundary extends to the Hackensack, and includes what is
rt a county area. All these points, however, can, in time,
timated. The great work for cities, and also for larger
ɪ and for some other special localities in counties, is, after
ing the general estimate to take measures to examine sec-
and parts and find out just where the chief diseases and
ntible causes of disease are to be found. Vital facts as to
ɪationality, etc., are fully on record, but, as yet, not sufficient
rrect inferences.

DISEASES.

e principal causes of disease have been singled out and tab-
l, as found in the report. These include what are known
notic diseases, many of which are owing to local or prevent-
ɔauses. It is also true of most of the other diseases that
ɪr in this list of the principal causes of disease that they
y depend upon foul air, poor food, poor water supply,
e moisture, or other causes that admit of abatement or
ɔl. Out of the 20,440 deaths in the twenty-one counties
7 are embraced within these principal causes. The rest are
red among accidents and less prevalent causes of disease.
e estimate no disease of any child under one month of age
ɔluded, since these are so often loosely stated or connected

with earlier malnutrition that they would swell the report of infantile diseases beyond their real significance. Of the 15,797 deaths from these principal causes 8,738 occurred in the twenty-one cities of the State, of over 5,000 inhabitants. The total population of these cities is 486,541, that of the rest of the State being 534,043. The tables are of great interest as showing the principal causes of disease, a death-rate of 17.95 for these principal causes in the twenty-one cities, and of 13.21 outside of these. The study and comparisons of such tables help to correct impressions as to the prevalence of disease or epidemics in certain localities. Often these impressions are derived from a few cases, or from one or two sudden deaths, or several in two or three families, or from the inaccurate methods of some physicians in speaking of this or that disease as prevailing.

SMALL-POX.

No case of small pox is reported in the State. New York city, with about the same population reported only two cases the last year, both of which occurred from a non-resident. It must be admitted that epidemics have a kind of periodicity. It is claimed by many that this results from the fact that at the time of a severe epidemic many have it or die, and as in the case of small pox great numbers are vaccinated, and so protected. Thus the material for the disease diminishes, and what remains is so separated and cases so isolated that the disease can not reach the proportion of an epidemic. This is true, although it is also probably true that infection may have their "epizootic" waves which reach us only occasionally. It is the conjunction of meterological and local conditions that causes the epidemic. The former we must study but can not always control. The latter it is believed we can. If so we as effectually prevent result as if we had charge of both of the necessary factors. Even as to the former we may sometimes define the conditions and so protect themselves from them.

DIPHTHERIA AND CROUP.

The number of deaths from diphtheria and croup (1,100) may well excite attention. It is not like consumption, a hereditary

isease, or one dependent upon a variety of causes, but in its ıvasion is believed to be owing to specific infection from ıithout. With many the cause of membranous croup and membranous" diphtheria is regarded as identical. They are ow so nearly allied in the nomenclature of the profession as ot to be separable in returns. The persuasion is gaining round that the causes of inception are often local, and that we ust seek and shall secure prevention of its causes.

SCARLET FEVER.

Scarlet fever with its 627 deaths is still a dreaded scourge of hildhood. It is now the topic of much hopeful inquiry. Recent facts look to a possible spontaneous origin of the disease ınder some flagrant circumstances.

Like diphtheria it needs to be watched in its places of greatest ɔrevalence, and the conditions and circumstances of its outreak carefully noted. When derived by imported contagion it an often be greatly limited in its virulence and extension. The jurisdiction to be exercised over schools in their relation o the prevalence of contagious diseases is a subject pressing ıpon us for consideration. It will require very definite declartion of the laws and circumstances of contagion or exposure on he part of physicians, and clear judgment from our educators. The time has come in sanitary science when opinions will not lo. The grounds of opinions must be given, in order that hese may be reviewed

BOWEL AFFECTIONS.

The large number of deaths from diarrhœal diseases, and especially as associated with the large prevalent death rate ınder five years of age, points very decidedly to local causes ɔf disease which must be abated. Cities hereby show their great accumulations of evil. When in some country places, as ılong the sea shore, death rate is high, it is in part traceable to hose brought thither for good air, too late to recuperate. Although we have not the data for separating accurately the deaths ımong temporary residents, we think that the death-rate of Atlantic county from this cause, registers higher per thousand han it otherwise would.

CONSUMPTION.

Consumption demands much careful study with reference to surroundings, localities and occupations. In some trades like those of hatting, glass-blowing, etc., it is always noticeable how often occupation is the cause of death. We refrain from tabulations which seem indicated, because not willing to reason from too few cases or insufficient data. But it is evident that many of our industries need studying in their bearings upon health, and in order to provide such protection from dust, heat, chemical fumes or ill-ventilated enclosures as will save skilled workmen from the incubus of diminished vitality, and the State from the loss of valuable lives. It will be possible ere long to show how certain diseases depend upon definite ascertained conditions, as plainly as the relations of cause and effect is shown in the other physical sciences. It will yet become one of those vital facts which will compel the notice of all rulers of the people, since the welfare of population must be provided for. Such legislation always proves more regulative than punitive, and benefits the whole people by preventing avoidable sources of depopulation and enfeeblement. Demoralization and degradation are often best provided against by attention to the household, school and workshop—protections to which every inhabitant is entitled.

REVIEW.

A review of the deaths and causes of deaths for the entire State, either shows that the past year was one of exceptional good health, or else that the State ranks very high in its capacity for health. A list of all of our smaller cities, and death rates calculated for the usual country areas, where there is a well-settled but scattered population, give us indications as to health, which are highly encouraging. It is highly probable that a death rate of not over 15 per thousand, could be secured by the application of well understood laws of hygiene, with the prospect of still further amelioration. How healthy cities may become is not yet determined. It has been shown in England and Scotland that with some special advantages which cities

enjoy of methodizing sanitary care, it is quite possible to bring down the rate of parts of cities to the rural average.

In our own State the contrast between rural and city districts is as marked as in some of the most neglected parts of our country. It is not too much to say that the imperfect sanitation of some of our most populous cities, and the meagre attention given to any thorough sanitary work, has greatly excited the surprise of sanitarians outside of the State, who have studied these and other similar areas. Hudson and Essex counties, especially, stand in need of a very exact and well-planned study of conditions which now are showing themselves by excessive death-rates, and an enfeeblement of population. The same is true of several cities.

The time has come for the careful study of the statistics of localities and careful consideration of the local care of population as to health. It is a question of prosperity and of progress for individuals and for the State. The State, by a well-devised system, now offers a helping hand. It now behooves that each city and district for itself should see to it that it seeks evidence rather than promiscuous opinions as to healthfulness or insalubrity, and that on the same careful and exact methods it finds what ought to be done, and how and when it should be done.

All that pursue such a course will find that economy and home interests, as well as philanthropy, require a well-planned and well-executed oversight of localities and population in a common cause and for the common welfare.

BER OF MARRIAGES, BIRTHS AND DEATHS, BY TOWNSHIPS.

Atlantic County.

	M.	B.	D.
.....	8	20	13
ty.....	19	62	64
a.....	0	19	4
r City.....	19	30	36
r Township.....	32	63	54
.....	12	50	41
.....	10	41	40
m.....	9	28	21
.....	2	14	7
.....	0	16	22
	111	353	302

Bergen County.

	M.	B.	D.
ol.....	23	51	62
.....	15	21	35
n.....	17	35	34
.....	31	55	64
.....	18	57	80
.....	3	19	31
adoes	33	141	102
.....	16	31	37
.....	7	36	49
d.....	2	30	20
ver.....	3	8	25
.....	11	77	45
m.....	14	67	53
	193	628	636

Burlington County.

	M.	B.	D.
Bass River	4	33	
Beverly City	8	37	
Beverly	4	21	
Bordentown	47	133	
Burlington	65	145	1
Chester	22	44	
Chesterfield	8	27	
Cinnaminson	14	61	
Evesham	3	41	
Florence	5	35	
Little Egg Harbor	19	46	
Lumberton	5	32	
Mansfield	5	38	
Medford	15	31	
Mt. Laurel	0	25	
New Hanover	21	53	
Northampton	69	85	
Pemberton	18	100	
Randolph	0	9	
Shamong	5	21	
Southampton	21	47	
Springfield	5	20	
Washington	3	11	
Westhampton	0	30	
Willingboro	5	23	
Woodland	2	7	
	373	1,155	

Camden County.

	M.	B.	D
Camden	341	888	
Centre	3	42	
Delaware	0	28	
Gloucester	14	78	
Gloucester City	28	125	
Haddon	22	71	
Stockton	11	26	
Waterford	17	50	
Winslow	9	40	
	445	1,348	1

Cape May County.

	M.	B.	D.
ity	5	41	5
	29	42	18
	28	43	37
	17	48	42
	16	21	18
	95	195	120

Cumberland County.

	M.	B.	D.
	82	219	133
	10	26	7
	6	35	25
	13	26	23
	20	72	87
	13	19	23
	13	31	28
	51	85	119
er	12	78	34
	62	218	137
	0	18	12
	282	827	628

Essex County.

	M.	B.	D.
	11	59	57
	38	120	110
	11	72	50
	19	39	30
	37	167	126
	10	20	29
	6	5	17
	9	40	33
	35	96	71
	1,022	3,567	3,116
	90	435	215
e	26	83	54
	9	39	39
	1,323	4,742	3,947

Gloucester County.

	M.	B.	D
Clayton	28	56	
Deptford	1	33	
Franklin	17	79	
Greenwich	17	56	
Glassboro	18	86	
Harrison	15	56	
Logan	5	29	
Mantua	11	43	
Monroe	9	30	
Washington	14	10	
West Deptford	2	38	
Woodbury	29	56	
Woolwich	9	43	
	175	613	

Hudson County.

	M.	B.	D
Bayonne	15	140	
Guttenberg	6	11	
Harrison	9	102	
Hoboken	221	795	
Jersey City	576	1,582	2
Kearney	5	43	
North Bergen	11	60	
Town of Union	34	140	
Union	3	30	
Weehawken	1	16	
West Hoboken	19	104	
	900	2,973	2

Hunterdon County.

	M.	B.	D.
.....	16	50	32
.....	15	38	26
.....	9	45	12
.....	35	74	41
ell.....	15	58	20
.....	14	23	17
n.....	8	44	12
ge.....	18	46	31
.....	2	13	9
.....	4	20	14
le	51	100	82
.....	28	59	31
.....	32	50	50
.....	23	75	63
.....	11	43	35
linton.....	4	23	20
.....	1	14	9
ell.....	4	16	14
	285	800	527

Mercer County.

	M.	B.	D.
urg.....	30	114	92
sor.....	14	33	36
.....	6	13	22
.....	19	57	52
.....	35	112	56
.....	9	51	62
.....	33	97	92
.....	264	596	653
n.....	5	18	16
lsor.....	8	22	28
	423	1,113	1,109

Middlesex County.

	M.	B.	D.
Cranbury	20	19	
East Brunswick	22	87	
Madison	0	9	
Monroe	12	38	
New Brunswick	107	428	
North Brunswick	10	28	
Perth Amboy	13	77	
Piscataway	14	63	
Raritan	11	46	
Sayreville	3	6	
South Amboy	9	52	
South Brunswick	21	60	
Woodbridge	10	53	
	252	966	

Monmouth County.

	M.	B.	D.
Atlantic	5	22	
Eatontown	20	44	
Freehold	35	99	
Holmdel	5	19	
Howell	28	74	
Manalapan	15	53	
Marlboro	4	28	
Matawan	20	66	
Middletown	16	86	
Millstone	32	39	
Neptune	8	32	
Ocean	49	222	
Raritan	39	94	
Shrewsbury	51	167	
Upper Freehold	18	35	
Wall	29	100	
	374	1,180	

Morris County.

	M.	B.	D.
.....	24	50	53
.....	26	60	58
.....	9	37	25
.....	10	60	104
.....	12	18	31
.....	14	44	22
.....	3	11	21
.....	41	127	114
e.....	12	45	25
.....	7	23	23
s.....	12	43	33
.....	40	140	119
.....	29	178	130
.....	10	49	49
.....	13	58	22
	262	943	829

Ocean County.

	M.	B.	D.
.....	2	24	11
.....	14	64	56
.....	21	57	40
.....	1	9	6
.....	5	30	17
.....	6	19	16
.....	4	11	7
.....	5	2	9
.....	13	58	17
.....	7	22	28
.....	6	23	10
	84	318	217

Passaic County.

	M.	B.	D.
Aquackanonk	2	22	
Little Falls	10	15	
Manchester	2	1	
Passaic	43	204	
Paterson	347	1,218	
Pompton	30	42	
Wayne	0	14	
West Milford	16	47	
	440	1,563	

Salem County.

	M.	B.	D.
Elsinboro	1	4	
Lower Alloways Creek	6	22	
Lower Penn's Neck	24	24	
Mannington	0	47	
Pilesgrove	29	91	
Pittsgrove	1	61	
Quinton	11	30	
Salem	63	89	
Upper Alloways Creek	19	38	
Upper Penn's Neck	31	75	
Upper Pittsgrove	2	37	
	187	518	

Somerset County.

	M.	B.	D.
Bedminster	13	34	
Bernards	19	62	
Branchburg	3	13	
Bridgewater	62	174	
Franklin	16	44	
Hillsborough	22	55	
Montgomery	17	41	
North Plainfield	2	78	
Warren	5	6	
	159	507	

Sussex County.

	M.	B.	D.
	11	21	19
	12	15	16
	12	25	19
	3	12	14
	16	42	34
	4	11	10
	6	10	22
	3	24	9
	29	40	38
	14	21	19
	7	34	26
	14	32	21
	15	6	11
	10	13	17
	13	49	55
	169	355	330

Union County.

	M.	B.	D.
	0	1	2
	2	13	12
	168	747	472
	1	16	15
	5	37	29
dence	0	17	28
	19	188	130
	58	105	169
	8	24	19
	10	33	15
	2	33	35
	10	44	40
	283	1,258	966

Warren County.

	M.	B.	D.
Allamuchy	10	9	
Belvidere	17	46	
Blairstown	13	32	
Franklin	20	24	
Frelinghuysen	11	18	
Greenwich	9	53	
Hackettstown	29	39	
Hardwick	1	12	
Harmony	8	45	
Hope	14	22	
Independence	13	28	
Knowlton	5	31	
Lapatcong	3	30	
Mansfield	5	40	
Oxford	29	35	
Pahaquarry	1	6	
Phillipsburg	51	213	
Town of Washington	37	58	
Washington	6	21	
	281	762	

Totals of Marriages, Births and Deaths for all the counties.

COUNTIES.	M.	B.	D.
Atlantic	111	352	
Bergen	193	628	
Burlington	373	1,155	
Camden	445	1,348	
Cape May	95	195	
Cumberland	282	827	
Essex	1,323	4,742	
Gloucester	175	613	
Hudson	900	2,973	
Hunterdon	285	800	
Mercer	428	1,113	
Middlesex	252	986	
Monmouth	374	1,180	
Morris	262	943	
Ocean	84	318	
Passaic	440	1,563	
Salem	187	518	
Somerset	159	507	
Sussex	169	555	
Union	283	1,258	
Warren	281	762	
Total	7,096	23,116	20,440

COUNTIES OF NEW JERSEY.	DEATHS AT ALL AGES.							Population, census of 1875.	Death rate per 1000.	PRINCIPAL CAUSES OF DEATH.																Total deaths from these diseases.
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.			Remittent fever, etc.	Typhoid fever.‡	Scarlet fever.	Measles.	Whooping cough.	Croup & Diphtheria.	Diarrhœal diseases.	Consumption.	Acute Lung Diseases.	Brain and nervous diseases of child'n.	Disease of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Erysipelas.	Digestive and Intestinal.	Cancer.	Acute Rheumatism.	Puerperal.	
Atlantic	67	112	136	265	117	3	302	15,158	*19.94	20	5	26	3	4	35	44	47	32	30	11	10	15	1	21	1	1	2	216
Bergen	124	112	136	265	117	2	656	35,316	17.80	20	5	26	3	10	36	42	58	76	61	31	21	43	2	36	4	7	2	419
Burlington	207	136	169	271	205	11	809	32,153	16.69	20	5	26	3	10	36	42	58	76	61	31	21	43	2	36	4	7	2	419
Camden	182	135	171	315	121	7	931	32,944	19.84	20	5	26	3	10	36	42	58	76	61	31	21	43	2	36	4	7	2	419
Cape May	55	31	47	89	50	3	275	8,180	14.62	4	2	1		1	5	7	8	5	5	3	2	4		2	1			50
Cumberland	109	82	121	212	120	11	655	25,311	17.30	15	14	14	1	2	21	31	37	31	31	14	11	18	1	20	2	3	1	306
Essex	938	488	1,254	2,047	824	34	5,547	188,412	29.44	145	76	145	9	31	251	351	414	351	351	184	106	196	13	256	30	46	24	2,984
Gloucester	81	69	114	167	124	6	561	24,486	17.60	10	6	7	1	2	16	22	25	20	20	9	7	12	1	13	1	2	1	196
Hudson	1,010	511	1,199	1,999	454	61	5,235	168,000	34.27	145	76	145	9	31	251	351	414	351	351	184	106	196	13	256	30	46	24	2,984
Hunterdon	111	82	124	204	139	9	669	27,473	14.06	15	8	11	1	4	25	31	37	31	31	14	11	18	1	20	2	3	1	306
Mercer	222	136	202	359	180	9	1,108	49,364	21.55	20	5	26	3	10	36	42	58	76	61	31	21	43	2	36	4	7	2	419
Middlesex	186	135	171	315	121	7	935	32,944	17.32	15	14	14	1	2	21	31	37	31	31	14	11	18	1	20	2	3	1	306
Monmouth	226	145	236	425	226	11	1,268	49,360	16.91	20	5	26	3	10	36	42	58	76	61	31	21	43	2	36	4	7	2	419
Morris	150	89	179	279	220	11	829	49,019	15.83	14	8	11	1	4	25	31	37	31	31	14	11	18	1	20	2	3	1	306
Ocean	39	39	59	55	27	8	217	13,705	15.83	4	2	1		1	5	7	8	5	5	3	2	4		2	1			50
Passaic	262	115	218	418	165	13	1,291	32,113	17.30	15	14	14	1	2	21	31	37	31	31	14	11	18	1	20	2	3	1	306
Salem	87	39	83	104	54	5	372	17,453	15.62	10	6	7	1	2	16	22	25	20	20	9	7	12	1	13	1	2	1	196
Somerset	60	42	74	134	110	9	429	17,019	18.74	10	6	7	1	2	16	22	25	20	20	9	7	12	1	13	1	2	1	196
Sussex	60	39	74	134	110	9	426	17,019	18.74	10	6	7	1	2	16	22	25	20	20	9	7	12	1	13	1	2	1	196
Union	265	156	244	368	144	9	966	51,758	18.66	20	5	26	3	10	36	42	58	76	61	31	21	43	2	36	4	7	2	419
Warren	126	57	149	249	140	7	727	27,389	13.96	10	6	7	1	2	16	22	25	20	20	9	7	12	1	13	1	2	1	196
	4,452	†1,467	1,965	5,950	4,317	349	20,440	1020,504	20.03	324	627	77	271	1,100	1,449	2,788	2,100	1,647	972	558	1314	137	1,041	378	76	104	15,797

†Total deaths under five 7,919.

*Death rate too high by reason of defects in the census of county.
‡Death rate, exclusive of cities of over 5000 inhabitants from these diseases, 13.21 per thousand.

§Small Pox omitted because no deaths occur therefrom.

Return of Deaths from all Causes and certain specified Diseases, in the Larger Cities of the State of New Jersey, for the year ending July 1st, 1879.

Incorporated Cities of the State Having by the Census of 1875 over 5000 Inhabitants. Statistical Divisions.	DEATHS AT ALL AGES.							Population, census of 1878.	Death rate per 1000.	PRINCIPAL CAUSES OF DEATH.																	Area of cities so far as given in same.
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.			Remittent fever, etc.	Typhoid fever.	Scarlet fever.	Measles.	Whooping Cough.	Croup & Diphtheria.	Diarrhœal diseases	Consumption.	Acute lung diseases	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Erysipelas.	Digestive and Intestinal.	Cancer.	Acute Rheumatism.	Puerperal.	
Burlington Co.																											
Burlington	24	34	15	44	36	1	154	7,297	21.10	2	5	5	.....	3	19	9	28	15	10	9	7	9	.....	9	3	.....	3	.....
Bordentown	14	17	5	24	26	.....	86	5,110	16.82	.....	1	2	.....	1	5	4	17	5	14	7	3	3	.....	7	1	.....	1	.....
Camden Co.																											
Camden	101	144	91	206	125	6	673	33,852	19.88	4	16	26	.....	15	62	27	129	76	71	35	20	36	1	31	10	2	5	6 50-100
Gloucester city	16	7	16	26	7	.....	72	5,105	14.10	.....	1	1	.....	.....	1	8	19	5	13	2	.....	1	.....	8	1	1	2	1 50-100
Cumberland Co.																											
Bridgeton	26	31	10	30	30	6	133	7,953	16.72	.....	5	11	.....	1	10	15	21	19	5	10	1	7	1	8	4	.....	.....	9
Millville	31	35	13	33	25	.....	137	6,775	20.22	.....	2	10	.....	1	14	18	14	12	17	6	1	10	.....	6	5	.....	.....	41
Essex Co.																											
Newark	757	569	327	986	460	17	3,116	123,310	25.26	60	65	120	28	44	214	242	448	309	328	142	84	157	18	111	57	9	24	17 91-100
Orange city	57	40	16	70	29	3	215	10,813	19.88	1	3	1	4	5	5	12	33	37	32	8	3	13	2	7	6	.....	4	2 50-100
East Orange	26	20	9	39	32	.....	126	6,497	19.39	2	2	7	.....	1	5	10	13	14	15	12	2	8	2	3	4	1	3	4 25-100
Hudson Co.																											
Jersey City	637	531	216	793	302	38	2,517	109,227	23.04	55	30	98	6	36	51	336	327	254	221	92	59	90	13	123	39	6	39	.....
Hoboken	179	166	57	200	59	8	669	24,766	27.01	8	6	16	4	18	75	93	76	78	71	26	17	20	3	14	10	.....	7	.....
Bayonne	48	40	11	40	12	5	156	5,836	26.73	1	.....	4	2	4	14	18	13	20	16	3	6	3	3	4	2	.....	1	.....
West Hoboken	25	21	14	23	12	.....	95	5,219	18.20	3	1	12	.....	1	7	10	7	11	10	2	3	2	1	7	1	.....	.....	.....
Mercer Co.																											
Trenton	129	65	55	236	123	45	653	25,031	26.08	1	6	16	.....	4	23	72	108	61	29	20	15	65	4	40	10	2	12	.....
Middlesex Co.																											
New Brunswick	74	51	37	100	63	.....	325	16,660	19.50	4	12	7	1	14	17	25	47	39	31	20	8	20	.....	11	8	.....	.....	.....
Morris Co.																											
Morristown	21	22	4	32	32	3	114	6,950	16.40	2	3	2	.....	9	.....	5	18	13	14	4	3	15	1	5	1	.....	2	.....
Passaic Co.																											
Paterson	205	154	92	341	195	7	994	38,814	25.61	16	5	37	5	9	41	107	156	94	84	50	22	71	5	63	17	4	17	8 36 100
Union Co.																											
Elizabeth	105	92	51	129	91	4	472	25,923	18.20	6	5	7	.....	5	48	47	51	58	49	22	19	38	4	24	8	1	5	6 60 100
Plainfield	29	24	12	31	32	2	130	7,216	18.01	1	1	4	.....	1	3	10	17	17	19	6	6	13	2	4	3	.....	1	5 92 100
Rahway	28	13	10	62	56	.....	169	6,947	24.31	4	1	.....	2	.....	.....	11	32	17	13	11	6	10	3	9	5	1	2	4
Warren Co.																											
Phillipsburg	36	12	11	35	7	1	102	7,240	14.08	.....	3	6	.....	.....	5	10	13	8	4	2	.....	7	.....	6	1	.....	2	75-100
Totals	2,588	2,088	1,172	3,480	1,764	146	11,238	486,841	.....	170	178	392	52	172	619	1,146	1,548	1,189	1,036	492	285	588	64	500	198	27	120	8,738 being 17.95 per 1000 from these diseases.

COUNTY OF ATLANTIC. *POPULATION 15,138. STATISTICAL DIVISIONS.	DEATHS AT ALL AGES.							Population, census of 1870.	Death rate per 1000.	PRINCIPAL CAUSES OF DEATH.																		Puerperal.
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.			Remittent fever, etc.	Typhoid fever.	Scarlet fever.	Measles.	Whooping cough.	Croup & Diphtheria.	Diarrhœal diseases.	Consumption.	Acute lung disease.	Brain and nervous diseases of children	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Erysipelas.	Digestive or Intestinal diseases.	Cancer.	Acute Rheumatism.		
Absecon	4	4	4	1	1	.....	13	629	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Atlantic City	12	24	7	14	7	.....	64	3,422	.....	.....	.....	.....	.....	1	.....	14	10	.....	6	4	1	.....	.....	2	.....	.....	.....	.....
Buena Vista	4	4	.....	.....	.....	.....	4	837	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Egg Harbor City	10	5	.....	10	10	1	36	1,516	.....	.....	.....	1	.....	.....	.....	5	6	.....	5	.....	.....	.....	1	3	.....	.....	1	O. Dropsy.
Egg Harbor Twp.	13	15	4	6	16	.....	54	3,540	.....	.....	1	.....	.....	1	10	5	4	.....	6	1	4	.....	.....	4	2	.....	.....	Died in C.B.1
Galloway	6	10	2	9	14	.....	41	2,189	.....	.....	.....	1	.....	.....	21	9	4	6	4	1	2	.....	.....	5	3	.....	.....	.....
Hamilton	14	10	6	6	4	.....	40	1,358	.....	.....	4	.....	.....	.....	.....	1	4	1	1	.....	2	1	.....	1	1	.....	.....	.....
Hammonton	2	3	.....	9	6	1	21	1,545	.....	.....	.....	.....	.....	.....	.....	1	4	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....
Mullica	1	.....	.....	3	2	1	7	862	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
Weymouth	5	2	.....	6	6	.....	22	695	.....	.....	1	.....	.....	1	.....	.....	4	.....	.....	.....	1	.....	.....	3	.....	.....	1	Mitritis, 1.
	67	77	22	67	66	3	302	.....	.....	.....	5	3	.....	4	35	35	44	35	32	30	14	10	15	21	7	1		2

*Population of Atlantic City and some of the townships of Atlantic county is imperfect in the census of 1875.

Return of Deaths from all Causes and certain specified Diseases, in the Statistical Divisions of the State of New Jersey, for the year ending July 1st, 1879.

COUNTY OF BERGEN. Population, 35,516. Statistical Divisions.	DEATHS AT ALL AGES.							PRINCIPAL CAUSES OF DEATH.																		
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.	Population, census of 1875.	Death rate per 1000.	Remittent fever, etc.	Typhoid fever.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhœal diseases.	Consumption.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Erysipelas.	Adult digestive and intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.
Englewood	15	13				1						3														C. B. 1
Franklin																										
Harrington																										Death in C B 1
Hohokus																										C. B. 1
Lodi																										C. B. 1
Midland																										
New Barbadoes	26					1	102	4,352		3									13							C. B. 1
Palisade								1,894																		
Ridgefield	14						49	3,564		1																
Ridgewood																										
Saddle River								1,424																		
Union								3,057																		
Washington						1	52	3,000		4																C. B. 1
	124	112	55	187	150	8	636		17.90	20	6	28	6	9	26	40	87	76	67	60	12	43	1	28	13	6

Deaths for the year ending [illegible]

COUNTY OF BURLINGTON.
Population 83,155.
Statistical Divisions.

	DEATHS AT ALL AGES.								PRINCIPAL CAUSES OF DEATH.																								
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.	Population, census of 1875.	Death rate per 1000.	Remittent fever, etc.	Typhoid fever.	Scarlet fever.	Measles.	Whooping cough.	Croup & Diphtheria.	Diarrhœal diseases.	Consumption.	Acute Lung Diseases.	Brain and nervous diseases of children	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Erysipelas.	Digestive and Intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.					
Bass River	2	1	1	1	1		6	1,063									1														
Beverly	14	11	2	1	1		29	2,361			1				2		10	1	1	1		1		1							
Bordentown*	14	11	2	1	1		29	2,110		2	1	2			2	1	12	1	1	1		1		1							
Burlington*	24	15	4	1	1		45	3,207			1				1		4														
Chester	24	15	4	1	1		45	4,412							1		4														
Chesterfield	24	15	4	1	1		45	1,329							1		4														
Chinnaminson	24	15	4	1	1		45	1,353							1		4														
Evesham	24	15	4	1	1		45	1,334							1		4														
Florence	24	15	4	1	1		45	1,840							1		4														
Little Egg Harbor	24	15	4	1	1		45	1,615							1		4														
Lumberton	24	15	4	1	1		45	1,307							1		4														
Mansfield	24	15	4	1	1		45	2,268							1		4														
Medford	24	15	4	1	1		45	2,673							1		4														
Mount Laurel	24	15	4	1	1		45	1,532							1		4														
New Hanover	24	15	4	1	1		45	4,108							1		4														
Northampton	24	15	4	1	1		45	2,068							1		4														
Pemberton	24	15	4	1	1		45	2,460							1		4														
Randolph	24	15	4	1	1		45	1,667							1		4														
Shamong	24	15	4	1	1		45	2,450							1		4														
Southampton	24	15	4	1	1		45	1,747							1		4														
Springfield	24	15	4	1	1		45	1,490							1		4														
Washington	24	15	4	1	1		45	1,230							1		4														
Westhampton	24	15	4	1	1		45	1,680							1		4														
Willingboro	24	15	4	1	1		45	1,333							1		4														
Woodland	24	15	4	1	1		45	[illegible]							1		4														
Death rate per 1000 of county									18.60																						
Death rate per 1000 of county, exclusive of cities									18.38																						
	207	136	81	257	291	17	989	83,155		5	25	23		10	61	82	135	94	77	58	36	63	1	72	28	4	10				

*See register of cities.

Return of Deaths from all Causes and certain specified Diseases, in the Seatistical Divisions of the State of New Jersey, for the year ending July 1st, 1879.

COUNTY OF CAMDEN. Population, 52,994. Statistical Divisions.	DEATHS AT ALL AGES.									PRINCIPAL CAUSES OF DEATH.																		
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.	Population, census of 1875.	Death rate per 1000.	Remittent fever, etc.	Typhoid fever.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhœal diseases.	Consumption.	Acute lung diseases.	Brain and nervous senses of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Erysipelas.	Digestive and intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.
Camden City*	101	144	91	206	125	6	673	33,852	.....	4	16	26	.....	15	82	77	120	76	71	35	20	36	1	31	10	2	4
Centre	9	5	1	8	5	.....	28	1,261	.....	.....	1	.....	.....	1	3	.....	2	.....	3	2	.....	.....	.....	1	.....	.....	.....
Delaware	13	4	1	4	11	.....	33	1,359	.....	.....	.....	2	.....	.....	.....	4	1	6	5	4	1	4	.....	.....	.....	.....	.....
Gloucester	11	4	2	26	20	3	66	2,501	.....	1	1	.....	.....	.....	1	3	14	6	2	3	.....	14	.....	5	.....	.....	1
Gloucester City*	16	7	16	26	7	.....	72	3,105	.....	.....	1	1	.....	.....	1	3	19	5	13	2	1	1	.....	8	1	1	2
Haddon	10	2	3	17	13	2	47	2,541	.....	.....	.....	1	.....	.....	2	3	11	2	2	1	2	5	.....	3	1	.....	.....
Merchantville†								580	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Stockton	12	35	12	29	13	1	72	2,106	.....	.....	.....	.....	.....	3	5	8	14	5	9	4	2	5	.....	5	4	.....	1
Waterford	13	6	3	7	10	.....	38	2,003	.....	.....	1	1	.....	.....	1	6	4	5	4	.....	.....	4	1	3	1	.....	1
Winslow	7	10	2	1	8	.....	28	1,787	.....	.....	.....	3	.....	2	2	1	2	5	2	.....	.....	.....	2	3	.....	1	.....
Death rate per 1000 for county	.....	.....	.....	.....	.....	.....	.....	.....	19.98	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Death rate per 1000 for county exclusive of cities*	.....	.....	.....	.....	.....	.....	.....	.....	22.36	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	192	205	121	315	212	14	1,059	52,904	.....	5	20	34	.....	21	77	120	187	116	101	54	25	71	4	58	17	4	9

*See Register of cities and low rate of Gloucester City. †See Stockton.

COUNTY OF CAPE MAY.
Population, 8,190.

| Statistical Divisions. | DEATHS AT ALL AGES. | | | | | | | | PRINCIPAL CAUSES OF DEATH. | | | | | | | |

Return of Deaths from all Causes and certain specified Diseases, in the Statistical Divisions of the State of New Jersey, for the year ending July 1st, 1879.

COUNTY OF CUMBERLAND. Population 35,311. Statistical Divisions.	DEATHS AT ALL AGES.								PRINCIPAL CAUSES OF DEATH.																						
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.	Population, census of 1875.	Death rate per 1000.	Remittent fever, etc.	Typhoid fever.	Scarlet fever.	Measles.	Whooping cough.	Croup & Diphtheria.	Diarrhœal diseases.	Consumption.	Acute Lung Diseases.	Brain and nervous diseases of children	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Erysipelas.	Digestive and intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.				
Bridgeton	26	31	10	39	30	6	133	7,933	.....	.....	5	11	.....	1	10	15	13	19	5	10	1	.....	1	8	4	.....	.....				
Commercial	.....	.....	.....	.....	.....	.....	.....	1,152	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1				
Deerfield	.....	.....	.....	.....	.....	.....	.....	1,470	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....				
Downs	.....	.....	.....	.....	.....	.....	.....	1,920	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....				
Fairfield	.....	.....	.....	.....	.....	.....	.....	3,350	.....	1	.....	.....	.....	.....	15	6	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....				
Greenwich	.....	.....	.....	.....	.....	.....	.....	1,177	.....	.....	.....	.....	.....	.....	1	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....				
Hopewell	.....	.....	.....	.....	.....	.....	.....	1,715	.....	.....	.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....				
Landis	.....	.....	.....	.....	.....	.....	.....	5,431	.....	.....	.....	4	1	.....	7	6	.....	15	1	.....	.....	.....	.....	1	.....	5	.....				
Maurice River	.....	.....	.....	.....	.....	.....	.....	2,662	.....	.....	.....	.....	.....	.....	.....	1	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	.....				
Millville	31	35	13	58	25	.....	137	6,733	.....	.....	2	10	.....	1	14	18	14	12	4	17	3	1	10	.....	5	.....	.....				
Stoe Creek	5	.....	1	5	1	.....	12	1,144	.....	.....	.....	.....	.....	.....	1	1	1	.....	.....	1	.....	.....	1	.....	1	.....	.....				
Death rate per 1000 for county	.....	.....	.....	.....	.....	.....	.....	.....	17.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....				
Death rate per 1000 for county, exclusive of cities	.....	.....	.....	.....	.....	.....	.....	.....	17.39	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....				
	109	117	62	167	150	23	628	35,311	.....	1	14	33	1	2	51	53	42	70	47	38	17	41	5	39	15	3	3				

*See Register of cities.

COUNTY OF ESSEX. Population, 168,812. Statistical Divisions.	DEATHS AT ALL AGES.						Population, census of 1875.	Death rate per 1000.	PRINCIPAL CAUSES OF DEATH.																				
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.		Remittent fever, etc.	Typhoid fever.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhœal diseases.	Consumption.	Acute lung disease.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Erysipelas.	Digestive and intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.		
Belleville	14	10	2	13	15		57		1		1		2		4	4	10	13	5				1					
Bloomfield	17	15	18	26	34		110		4	3	5		1	15	3	14	8	11	4	2	6	2	1					
Caldwell	8	7	5	9	23		50		3	2				2	1	6	5	1	5	1	6		2					
Clinton	7	5	2	9	6		30							1	4	2	2	3	2		2							
East Orange	26	20	6	39	32		126		2	2	1	1	1	5	2	13	5	15	12	2	2	1	3	3				
Franklin	6	5	3	12	7		29									4	1	2	1				1					
Livingston	1	1	1	5	5		17									1		2	2									
Millburn	3	3	6	9	6		33								1	3	1	1	1		1		3					
Montclair	10	8	5	18	19		71		4	4			3	4	2	5	7	4	7	2	6	1	4			1		
Newark	557	568	327	986	460	17	3,116	125,310	60	65	120	28	44	214	242	446	309	328	142	84	157	18	111	57	9	24		
Orange	57	40	16	70	29		215	10,413	1	3	1	4	5	5	12	31	37	32	8	3	13	2	7	6				
South Orange	15	6	2	13	13		54	3,252	2				2	2	4	9	2	2	4	4	3	2	2	2	1			
West Orange	8	2	4	10	15		39	2,825				2		4	3	5	10	7	4	1	3	3						
Death rate per 1000 for county								23.38																				
Death rate per 1000 for county exclusive of cities								17.38																				
	938	695	400	1,224	666	24	3,947	168,812	85	76	145	37	60	253	295	534	413	414	198	104	220	33	144	75	13	26		

Return of Deaths from all Causes and certain specified Diseases, in the Statistical Divisions of the State of New Jersey, for the year ending July 1st, 1879.

COUNTY OF GLOUCESTER. Population, 24,486. Statistical Divisions.	DEATHS AT ALL AGES.							Population, census of 1875.	Death rate per 1000.	PRINCIPAL CAUSES OF DEATH.																
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.			Remittent fever, etc.	Typhoid fever.	Scarlet fever.	Measles.	Whooping cough.	Croup & Diphtheria.	Diarrhœal diseases.	Consumption.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Erysipelas.	Digestive and intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.
Clayton	2	4	1	7	1		17	3,744			1															
Deptford	2	4	4	9	5		35	1,304			1				4	2	3			1	3	2	1		4	
Franklin	1	2	3	5	4		24	2,159								2	4			1		4				
Glassboro	1	2	3	8	5		24			3	1			3	1	2	4			1		1				
Greenwich	1	2	3	13	5		34	2,340			1				1	2	4			1		4	1		4	
Harrison	1	2	5	9	5		24	2,385		2	4				5	4	4	1		1		2	1		2	
Logan	1	1	4	5	3		14									1	4									
Mantua	1	1	1	8	3		23	1,710							1	2	5					1			1	
Monroe	3	5	10	10	6	2	38	1,696		1	6		1	1		2	5	1		1		1				
Washington	3	4	5	10	8		30	1,317						1	1	1	4			1	1	3	1			
West Deptford	2	3	2	8	3		25	1,462			3				1	2	4			1		4				
Woodbury	2	2	2	15	4		25	2,029		2				1	1	2	4			1		2			2	
Woolwich	6	10	5	11	6		38	3,840						1	6	2	5			1		2			1	2
Death rate per 1000 for county									17.60																	
	81	69	37	114	124	6	431	24,486		10	17	9	1	7	23	32	67	55	26	14	8	26	4	24	8	2

| COUNTY OF HUDSON. Population, 163,000. Statistical Divisions. | DEATHS AT ALL AGES. | | | | | | | Population, census of 1875. | Death rate per 1000. | PRINCIPAL CAUSES OF DEATH. | | | | | | |

Return of Deaths from all Causes and certain specified Diseases, in the Statistical Divisions of the State of New Jersey, for the year ending July 1st, 1879.

COUNTY OF HUNTERDON. Population, 37,473. Statistical Divisions.	DEATHS AT ALL AGES.								PRINCIPAL CAUSES OF DEATH.																				
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.	Population, census of 1875.	Death rate per 1000.	Remittent fever, etc.	Typhoid fever.	Scarlet fever.	Measles.	Whooping Cough.	Croup & Diphtheria.	Diarrhœal iseases.	Consumption.	Acute lung diseases	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Erysipelas.	Digestive and intestinal.	Cancer.	Acute Rheumatism.	Puerperal.
Alexandria	3	1			17	1	22	1,416			1					1	4	5	1	3	1	5			1		
Bethlehem	1	3			9		13	2,826				1			2		3	4	1	1		2					
Clinton Borough	1						1	2,043								1		1					1				
Delaware	4	4			16	4	41	3,696									6	5	1	4	1	6			1		
East Amwell	2	3			10	1	20	1,684				1			1	2	1	1		1		3				1	
Franklin	1				7	2	17	1,353								1	1	1			1	6					
Frenchtown	1	1			5		12	960										1		1							
High Bridge	1	3			7	3	31	2,029							3	3	2	3	4	1	1	2			1		
Holland	2	1			3	1	9	1,852			1							4			1						
Kingwood	1				9	1	14	1,779								1	1	4	2		2	2			1		
Lambertville	18	6			12	1	42	4,134			1					2	2	7	2	5		4			2		
Lebanon	4	6			8		31	2,760			1			1	1		1	1		2		4			1		
Raritan	5	5			14		30	3,546		1		1			1	3	2	2		6	1	5			6		1
Readington	9	11			20	4	63	3,043							5	2	3	3	2	3		10		7			
Tewksbury	6	3			15	3	35	1,983			1					2	2	6	2	1		6	3		2		1
Town of Clinton	3	2			15	2	22	900				2			1	3	2			5	2	4			3		
Union	2				4		9	1,040				1				1	1	3			1			1			
West Amwell	2	1			7	1	14	1,018								1	1	1	1					2	1		
Death rate per 1000 for county									14.06																		
	71	52	47	124	204	29	527	37,473		1	9	8	2	1	16	29	50	55	32	32	18	63	4	37	19	1	2

COUNTY OF MERCER. Population, 49,894. Statistical Divisions.	DEATHS AT ALL AGES.						Population, census of 1875.	Death rate per 1000.	PRINCIPAL CAUSES OF DEATH.																					
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.		Remittent fever, etc.	Typhoid fever.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhœal diseases.	Consumption.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Tumors, diseases.	Adult brain and spinal diseases	Erysipelas.	Digestive and intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.				
Chambersburg	27	9	14	20	15	24	99			1	3	1		2	10	10	3	2	1	1	3	3	4	2	3	3				
East Windsor	8	3	4	10	10		35			1	3				5	3						4	2						
Ewing	3	1	3	3	1		11							1	2	6	2	1	1			1								
Hamilton	5	4	6	17	15		47							4	4	10	1	2	4	1	1	1	2							
Hopewell	8	4	6	17	19		54						1	4	2	12	4	2	4	1	1	1	2							
Lawrence	9	13	4	18	18		62		1	2	1			9	1	10	2	5	2	3	2	1	3	1		2				
Princeton	25	10	10	16	31		92			1					5	12	10	5	2	3	2	1	3	1	1	1				
Trenton	129	65	55	236	123	45	653		1	6	15	4	4	23	72	108	61	29	26	13	65	7	40	10	2	12				
Washington	2	1	3	4	1		10							1	1	3	3				1		1	1						
West Windsor	6	4	3	7	3		25						1	1	1	2	5						4							
Death rate per 1000 for county								22.25																						
Death rate per 1000 for county, exclusive of cities								18.34																						
	222	114	100	362	259	52	1,109		2	14	28	1	8	46	113	178	119	57	47	22	105	13	65	25	5	19				

Return of Deaths from all Causes and certain specified Diseases, in the Statistical Divisions of the State of New Jersey, for the year ending July 1st, 1879.

COUNTY OF MIDDLESEX. Population, 48,313. Statistical Divisions.	DEATHS AT ALL AGES.									PRINCIPAL CAUSES OF DEATH.																			
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.	Population, census of 1875.	Death rate per 1000.	Remittent fever, etc.	Typhoid fever.	Scarlet fever.	Measles.	Whooping cough.	Croup & Diphtheria.	Diarrhœal diseases.	Consumption.	Acute lung diseases.	Brain and nervous diseases of children	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Erysipelas.	Digestive and intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.
Cranbury	6	3	5	14	16	.....	44	1,651	.....	[illegible]	1	[illegible]	.....	1	.....	[illegible]	10	4	1	3	4	[illegible]	.....	[illegible]	1	.....	.....
East Brunswick	10	[illegible]	4	18	[illegible]	[illegible]	47	2,944	.....	.....	.....	1	.....	.....	5	5	11	[illegible]	3	1	3	[illegible]	.....	1	.....	.....	1
Madison	4	3	3	[illegible]	[illegible]	.....	19	1,637	.....	1	.....	[illegible]	.....	1	.....	3	1	1	1	1	.....	1	.....	4	.....	.....	.....
Monroe	[illegible]	[illegible]	[illegible]	12	[illegible]	.....	42	2,450	.....	.....	3	1	.....	1	.....	[illegible]	7	4	[illegible]	[illegible]	[illegible]	[illegible]	.....	4	1	.....	.....
New Brunswick	74	51	37	100	61	.....	325	16,690	.....	4	12	7	1	14	17	25	47	39	31	20	[illegible]	20	.....	11	8	.....	.....
North Brunswick	4	1	1	5	4	.....	15	1,155	.....	.....	1	.....	.....	1	.....	[illegible]	3	[illegible]	.....	[illegible]	1	.....	.....	[illegible]	.....	.....	.....
Perth Amboy	17	16	9	20	14	1	77	3,770	.....	1	3	5	.....	.....	[illegible]	12	5	14	[illegible]	[illegible]	[illegible]	4	.....	[illegible]	[illegible]	.....	.....
Piscataway	[illegible]	4	3	10	12	1	38	2,802	.....	.....	.....	.....	.....	.....	1	3	1	[illegible]	1	6	5	.....	.....	3	1	.....	[illegible]
Raritan	10	[illegible]	3	12	13	3	43	3,647	.....	[illegible]	.....	.....	.....	.....	.....	3	3	5	1	3	.....	[illegible]	[illegible]	3	.....	.....	1
Sayreville	.....	1	.....	1	3	.....	5	.....	.....	.....	.....	.....	.....	.....	.....	1	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....
South Amboy	17	18	5	[illegible]	10	.....	72	5,193	.....	[illegible]	1	3	.....	3	[illegible]	12	5	10	[illegible]	1	1	3	1	3	.....	.....	1
South Brunswick	14	5	[illegible]	13	12	.....	46	2,699	.....	1	.....	.....	.....	3	1	3	[illegible]	[illegible]	[illegible]	[illegible]	2	4	.....	3	1	.....	.....
Woodbridge	14	[illegible]	10	19	12	2	64	3,705	.....	[illegible]	[illegible]	5	.....	.....	.....	10	9	[illegible]	6	[illegible]	1	4	.....	7	.....	.....	1
Death rate per 1000 for county...	.....	.....	.....	.....	.....	.....	.....	.....	17.32	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Death rate per 1000 for county, exclusive of cities	.....	.....	.....	.....	.....	.....	.....	.....	16.17	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	186	127	87	248	180	9	837	48,313	.....	15	23	26	1	24	28	88	110	95	63	44	30	46	5	51	14	.....	6

| COUNTY OF MONMOUTH. Population, 48,500. Statistical Divisions. | DEATHS AT ALL AGES. | | | | | | | PRINCIPAL CAUSES OF DEATH. | | | | | | |

Return of Deaths from all Causes and certain specified Diseases, in the Statistical Divisions of the State of New Jersey, for the year ending July 1st, 1879.

COUNTY OF MORRIS, Population, 49,019. Statistical Divisions.	DEATHS AT ALL AGES.								PRINCIPAL CAUSES OF DEATH.																				
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.	Population, census of 1875.	Death rate per 1000.	Remittent fever, etc.	Typhoid fever.	Scarlet fever.	Measles.	Whooping cough.	Croup & Diphtheria	Diarrhœal diseases.	Consumption.	Acute lung disease.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Erysipelas.	Digestive and intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.
Boonton	11			17	16		53	3,376					1	3	1	2	10	5	1	1	4	8		3	1	1	
Chatham	11	11		10	15		58	4,440			1			1	1	5	6	10	5		1	3		7			1
Chester				10	15		45	1,467							1		1	1									
Hanover				41	35		104	3,624		3	1			1	1	4	12	10	4	4	1	36		6	1		
Jefferson				11	10		31	1,740					1		2		3	4		4		4		4		1	
Mendham								1,620									1	10	4	1		2		1	1		1
Montville								1,443						1	1		1	4				1					
Morris								6,950						9		5	18	13	14	4	3	15	1		1		2
Mount Olive								1,760			1							5				1			1		
Passaic								1,718		1					1		6	6				1	2	1	1		
Pequannock								1,693		1			1	1	2					1		2		4	1	1	1
Randolph								7,576		1		20	1	1	4	13	12	10	17		5	8		1	1		3
Rockaway								6,826			1	4	3	1	18	10	12	29	16	4		10	2	1	3	1	4
Roxbury								2,157			1				4	9	5	3	3			4		2			1
Washington								2,429									3	1	1	3	1	5	2			1	
Death rate per 1000 for county									16.91																		
Death rate per 1000 for county, exclusive of cities									16.99																		
	150	145	76	225	219	14	829	49,019		14	8	31	9	18	37	56	111	96	62	31	15	102	7	46	11	6	15

COUNTY OF OCEAN. Population, 13,707. Statistical Divisions.	DEATHS AT ALL AGES.						Population, census of 1870.	PRINCIPAL CAUSES OF DEATH.																								
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.	Death rate per 1000.	Remittent fever, etc.	Typhoid fever.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhœal diseases.	Consumption.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Erysipelas.	Digestive and intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.
Berkeley	1	1	2	1	2		11							2	1	2											
Brick	3	3	1	1	1		5									1											
Dover	3	5	3	1	1		13			3						3											
Englewood																											
Jackson	1	6	2	1	3		13									1											
Lacey	1	3		1	1		6				1																
Manchester	1	2		2			5						1														
Ocean	1	2	1	1			4																				
Plumsted	1	1	1	2	1		6									1											
Stafford	3	1	1	2	1		8									1											
Union		2	1	1			4																				
Death rate per 1000 for county	39	38	19	50	55	7	217	15.83		6	3		4	16	17	122	20	18	8	4	15		14	1		3
							13,707																				
Berkeley							716																				
Brick							2,165																				
Dover							2,352																				
Englewood							524																				
Jackson							1,813																				
Lacey							780																				
Manchester							977																				
Ocean																											
Plumsted							1,568																				
Stafford							1,045																				
Union							1,886																				

Return of Deaths from all Causes and certain specified Diseases, in the Statistical Divisions of the State of New Jersey, for the year ending July 1st, 1879.

COUNTY OF PASSAIC. Population, 53,775. Statistical Divisions.	DEATHS AT ALL AGES.								PRINCIPAL CAUSES OF DEATH.																		
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.	Population, census of 1875.	Death rate per 1000.	Remittent fever, etc.	Typhoid fever.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhœal diseases.	Consumption.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Erysipelas.	Digestive and intestinal diseases.	Cancer	Acute Rheumatism.	Puerperal.
Acquackanonk	5			6	8		21	1,631				1				3	1	4	1	3	1			1	1		
Little Fall			3	5	4		16	1,457		1						1	3	1		1		1		2		1	
Manchester		1		4		1	14	1,344													1						
Passaic	35	33	15	24	19		124	4,883		1	1	3	1		15	18	10	15	18	6	6	4	1	5	1	1	1
Paterson	95	154	72	341	195	7	864	38,814		16	5	32	5	9	41	107	156	24	24	50	22	71	5	63	17	4	17
Pompton	5	7	1	11	25	1	50	1,544		4						4	4	2	1	2		3		1	1	1	2
Wayne	5	4		12	9		30	1,630		1					1	4	4	5	1	2	3	6	1	1	1		1
West Milford	3	5		13	13		34	2,472		1					3	3	8	5		6		3			2		
Death rate per 1000 for county									23.93																		
Death rate per 1000 for county, exclusive of cities									19.58																		
	262	206	115	418	277	9	1,287	53,775		24	6	40	6	9	60	137	186	137	106	74	32	88	8	73	23	7	22

COUNTY OF SALEM.

Population, 22,701.

Statistical Divisions.

DEATHS AT ALL AGES.

PRINCIPAL CAUSES OF DEATH.

Statistical Divisions.	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.	Population, census of 1875.	Death rate per 1000.	Remittent fever, etc.	Typhoid fever.	Scarlet fever.	Measles.	Whooping cough.	Croupous Diphtheritis.	Diarrhœal diseases.	Consumption.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Erysipelas.	Digestive and intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.
Elsinboro	1	1	1	2	3		8	635			1					1	2			1							
Lower Alloways Creek	2	2	1	2	6	1	13	1,386		1	2					1	4	2	1	1	2		1				
Lower Penn's Neck	2	3	4	2	6	1	18	1,365			2	2				1	4	2	1	2	1		1	1			
Mannington	1	3	4	3	6		17	1,850			1					1	4	2	1	1				1			
Pilesgrove	2	4	4	3	6		19	3,276			2	2				1	5	3	1	2	1	1		2			
Pittsgrove	2	3	4	3	3	1	16	1,684			1				1		2	1		1							
Quinton	2	2	2	2	2		10	1,146								1	2	1		1							
Salem	24	11	10	26	31	3	112	4,459		4	6	1		2	5	2	20	6	2	2	1	2	1	11	2	2	3
Upper Alloways Creek	14	6	4	17	9		50	1,816		1	1				3	2	10	3	1	2		1	1	2	1		
Upper Penn's Neck	15	4	5	17	13		54	2,042				2			5	2	8	1		2				2		1	
Upper Pittsgrove		2	3	11	5		21	2,052		1		1			6	2		1		1				2			
Death rate per 1000 for county									17.26																		
	57	43	39	103	105	15	392	22,701		6	14	6		2	14	41	73	26	15	17	6	29	5	27	7	3	3

Return of Deaths from all Causes and certain specified Diseases, in the Statistical Divisions of the State of New Jersey, for the year ending July 1st, 1879.

COUNTY OF SOMERSET Population, 27,453. Statistical Divisions.	DEATHS AT ALL AGES.							Population, census of 1875.	PRINCIPAL CAUSES OF DEATH.																	
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.		Death rate per 1000.	Remittent fever, etc.	Typhoid fever.	Scarlet fever.	Measles.	Whooping cough.	Croup & Diphtheria.	Diarrhœal diseases.	Consumption.	Acute lung diseases.	Brain and nervous diseases of children	Diseases of heart and circulation.	Urinary diseases.	Adult brain and spinal diseases.	Erysipelas.	Digestive or intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.
Bedminster								2,057			1						4	4	1							
Bernards								2,618							4		4	10								
Branchburg								1,288		1																
Bridgewater								7,514			1	1					16		5							
Franklin								4,040		1	1															
Hillsborough								3,569																		
Montgomery								2,452			1															
North Plainfield								2,818			1															
Warren								1,097		1					1											
Death rate per 1000 for county									15.62																	
	65	55	42	104	154	9	429	27,453		3	5	3	1	1	42	31	55	46	20	23	18	52		30	10	1	3

COUNTY OF SUSSEX. Population, 24,010. Statistical Divisions.	DEATHS AT ALL AGES.						Population, census of 1875.	Death rate per 1000.	PRINCIPAL CAUSES OF DEATH.																								
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.		Remittent fever, etc.	Typhoid fever	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhœal disease.	Consumption.	Acute lung disease.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary disease.	Adult brain and spinal disease.	Erysipelas.	Digestive and intestinal disease.	Cancer.	Acute Rheumatism.	Puerperal.						
Andover	2	2	1	1	1		7																									
Byram	2	1		1	1		5																									
Frankford	1	1		1	1		4																									
Greene	1	1		1	1		4																									
Hardyston	1	1		1	1		4																									
Hampton	2	1		1	1		5																									
Lafayette	1	1		1	1		4																									
Montague	1	1		1	1		4																									
Newton	2	1		1	1		5																									
Sandyston	1	1		1	1		4																									
Sparta	2	1		1	1		5																									
Stillwater	1	1		1	1		4																									
Vernon	2	1		1	1		5																									
Wallpack	1	1		1	1		4																									
Wantage	2	1		2	1		6																									
Death rate per 1000 for county	19	29	26	98	110	5	350																									
	19	16	19	14	34	10	21	9	38	19	26	21	11	17	55		350															
																	24,010															
									1,184	1,408	1,744	840	2,419	880	833	918	2,483	1,200	1,525	1,460	1,941	672	3,083									
																		13.74													
									1	1	1		4	1	1	1	2	1	1	1	3	1	1	1	1	1	1	5					
										1	3		1															10					
											1																	11					
																												.....					
									1				4															5					
										1				2			2											8					
											2				2	3												17					
									4	1	2	2	2	2	2	4	5	2										54					
											2	1	2	2	1	2	4	2										40					
									1					2		2		1	1	1	2							18					
											2	2	2		1	2	1		2	1	2							25					
													2															13					
											2	1	1	1	1	2	2	1	2	1	2	1	1	1	1	1	1	26					
																												2					
											1				1	1	1		1	1	1		1	1	1	1	1	20					
											1					1	1		1	1	1		1	1	1	1	1	9					
																												24					
																												5					

Return of Deaths from all Causes, and certain specified Diseases, in the Statistical Divisions of the State of New Jersey, for the year ending July 1st, 1879.

COUNTY OF UNION. Population, 51,758. Statistical Divisions,	DEATHS AT ALL AGES.							Population, census of 1875.	PRINCIPAL CAUSES OF DEATH.																
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.		Death rate per 1000.	Remittent fever, etc.	Typhoid fever	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhœal diseases.	Consumption.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Acute brain and spinal diseases.	Erysipelas.	Digestive and intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.
Clark				1	1		2	329																			
Cranford	4	1		2	2	1	12	1,110		1																	
Elizabeth	105	92	51	129	91	4	472	25,923		6	5	7		2	5	44	47	51	56	40	12	19	33	4	24	8	1
Fanwood		1			4		15				1					1	1		4		1		2				1
Linden		1	1	10	8	1	29	1,737		2				1					4	1		1	1		1		1
New Providence		4		5	14		28	838		1		1				2			2		1		4		1	1	
Plainfield	12	24	12	31	32	1	130	7,216		1	1	4		1		3	16	17	17	19	6	6	13		4	3	
Rahway	12	13	10	62	50		109	6,947		4	1		2				11	32	17	13	11	6	10		9	5	1
Springfield	4	4	2	4	5		19	819		4						1	1	2	4	4					1		
Summit	4	5		3	2		15	1,489		2						1	4	2	2				1				
Union	7	4	1	6	15	1	35	2,313		1		3					3	2	4		3		4		2	1	
Westfield	10	7	3	6	14		40	3,020			2					1	5	2	5	6	1	2	6		2		
Death rate per 1000 for county									18.66																		
Death rate per 1000 for county, exclusive of cities									19.27																		
	205	156	84	268	244	9	966	51,758		22	10	15	4	7	117	91	117	118	102	53	39	79	11	47	18	3	2

| COUNTY OF WARREN. Population, 37,389. Statistical Divisions. | DEATHS AT ALL AGES. | | | | | | | PRINCIPAL CAUSES OF DEATH. | | | | | | |

IRCULAR OF THE NEW JERSEY STATE BOARD OF HEALTH AS TO SANITARY APPLIANCES.

In the practical application of Sanitary science, it has become ecessary to use very many appliances, both for convenience and) guard against evils incident to household or city life. These ave become far more numerous and useful than is generally nown. To afford the citizens of this State a better opportunity r becoming acquainted with their merits, both by personal tamination and by the opinions of experts, we have conferred ith officers of the State Fair of New Jersey, and, as a State oard of Health, shall aid in an exhibition of sanitary appli- ıces therewith. This Fair is held each year, only a few miles om New York City, and near the direct route to Philadelphia ıd to the South and West. The attendance from this and her States is very large, and it affords the best opportunities r familiarizing the people with valuable improvements. It ens yearly about the middle of September.

Specimens may be sent either as competing for premiums or ı exhibit. Any articles sent from abroad may be consigned to ır care, through Morris's Express, 50 Broadway, New York, or rough other agents. Every article exhibited should bear a scriptive label, containing detailed information respecting its nstruction, its use, and the retail price and place at which it n be obtained. There is no charge for space. The small cost conveying goods to and from the exhibit must be borne by e exhibitors themselves. The articles must bear the names of e owner or the agency exhibiting it. Articles sent for exhibit our care should be directed "New Jersey State Fair, Waverly. ıre of New Jersey State Board of Health."

The State Board of Health has commenced at Trenton, the pital of the State, a museum of sanitary appliances, to which ıy owner or manufacturer may present the articles exhibited the property of the State, for permanent examination and hibit. Or they will by us be directed to the persons or agents th whom they are to be left.

By order of the New Jersey State Board of Health.

EZRA M. HUNT, M. D., Sec'y.

Trenton, N. J., July 7, 1879.

Letters of inquiry may be addressed to E. A. Osborn, C. E., iddletown, N. J., or to State Board of Health, Trenton, N. J.

INDEX.

GENERAL INDEX OF SUBJECTS.

	Page.
of the Secretary of the Board	5—29
Drainage and Sewerage, E. A. Osborn, C. E	31—36
xia—Drowning, T. G. Chattle, M. D	37—49
ration of Food, Prof. A. R. Leeds, Ph. D	51—68
ction, Ezra M. Hunt, M. D	69—91
ology as an aid to the Physician, Prof. C. F. Brackett, Ph. D.	93—100
of State Board of Health to Legislative Commission on ns	101—109
akers as Guardians of Public Health, E. M. Hunt, M. D..	111—121
y Legislation, E. S. Atwater, Att'y	123—142
ological Tables	143—151
ıd Circulars as to Vital Statistics, etc	153—172
of the Medical Superintendent of State Vital Statistics...	173—189

ALPHABETICAL INDEX.

Acts as to Vital Statistics 153
Adulteration of Foods 51, 128
Agricultural Society 7
Air Disinfection 70
Animals, Diseases of 9
Appliances, Sanitary 7
Arsenical Colors 67
Asphyxia 26, 32
Assessors 163, 168
Atwater, E. S. 129
Baking Powder, Adulteration of 55
Brackett, C. F. 98
Bread, Adulteration of 53
Board of Health, N. Y. 135
Burials, Hygienic Care of 111
Canned Goods 61
Causes of Miasm 19
Causes of Death 203
Calx Powder 73
Carbolic Acid 76
Chattle, T. G 37
Chattle Method—Drowning 47
Circulars 158, 163, 167–169
Circular on Disinfection 85
Circular, Sanitary 88
Cities, Circular to 169
City Clerks 163, 167, 168
Coffins 119
Confectionary 58
Comments on Returns of Vital Statistics 183
Commission, Legislative 6
Communication of Diseases at Funerals 113
Cosmetics 65
Consumption 188
Croup 186
Decisions, Sanitary 139
Disinfection and Disinfectants 27, 68
Diseases, Miasmatic 18
Digestive Diseases 187
Diseases of the Year 185
Drains 33
Diphtheria 186
Drainage and Miasm 25
Drowning 26, 40

Sanitary Legislation..... 133
cs. 8
f Vital Statistics, how corrected..... 180
Sanitary..... 7, 35
tory Circulars of Vital Statistics Law..... 158
..... 16
ıdulteration of..... 61
, Registrar-General..... 17
thod in Drowning..... 42
Method in Drowning..... 43
ıtes on Weather, etc..... 94
)rainage..... 25, 31
Survey..... 15
. M..... 5, 69, 111
on, Sanitary..... 14, 107, 128
ırg Reform School..... 5
Burial..... 112
Hon., Secretary of State 29
.o Vital Statistics..... 153
'rof. A. R..... 51
ive Commission..... 6
ion, Sanitary..... 28, 101, 123
anitary, to Commission on Government of Towns..... 101
d Salt Mixture..... 82
ing Association, United States and Michigan..... 43, 44
Adulteration of 65
ealth Board..... 132
ınitary Needs..... 9
Sewer and Drain Plan..... 34
es, Births and Deaths by Townships..... 161
ıusetts Legislation 131
Practice..... 126
Superintendent of State Vital Statistics..... 25, 173
)logy..... 27, 28, 93, 143
's of New Jersey State Board of Health..... 2, 3
n Legislation..... 130
..... 57
ıe Nuisance..... 11
tic Diseases..... 18
'ypes of Disease..... 25
ı, Sanitary..... 7
, Adulteration of..... 60
l Board of Health..... 8, 15
es..... 13, 108, 127, 136, 138
E. A..... 31
..... 72
ıg..... 33
)n Observations..... 145

Quarantine 8, 12
Rain 1
Record of Miasmatic Diseases, 1879 1
Recommendations as to Legislation .....
Registry, Dr Farr .....
Report of Secretary .....
Resorts .....
Results, Sanitary .....
Returns of Deaths .....
Russell, Dr .....
Rules of Tabulation of Vital Statistics .....
Sanitary Appliances .....
Scarlet Fever .....
Seaside Dangers .....
Secretary's Report .....
Satterthwaite, Dr., on Drowning .....
Sanitary Needs .....
Sewerage 2
Small Pox .....
Smoke Nuisance .....
Stench Nuisance .....
Snow .....
Statistics, Vital 25, 107, 12
Slaughter Houses .....
Superintendent, Medical, Report of .....
Subjects of Sanitary Legislation .....
Survey, Sanitary .....
Sugar, Adulterated .....
Sylvester Method in Drowning .....
Tabulation of Vital Statistics .....
Trades, Noxious 1
Tea and Coffee Adulteration .....
Traps .....
Typhoid Fever .....
Undertakers 2
Unnatural Deaths .....
Vaccination .....
Vinegar, Adulterated .....
Vital Statistics 25, 107, 125, 15
Warren County Drainage .....
Water Closets .....
Water as a Disinfectant .....
Weather Observers with the Senses .....
Wells in Sand .....
Whitehead, Hon. William A .....
Yellow Fever .....

ADDENDA.

The headline on page 27 should read "Government of Towns," instead of "Government of Forces."

FOURTH ANNUAL REPORT

OF THE

BOARD OF HEALTH

OF THE

STATE OF NEW JERSEY,

1880.

CAMDEN, N. J.:
PRINTED BY SINNICKSON CHEW.
1881.

FOURTH ANNUAL REPORT

OF THE

BOARD OF HEALTH

OF THE

STATE OF NEW JERSEY,

1880.

CAMDEN, N. J.:
PRINTED BY SINNICKSON CHEW.
1881.

rATE BOARD OF HEALTH.

:ENRY C. KELSEY, Secretary of State,
OHN P. STOCKTON, Attorney General,
} Members Ex-Officio.

	P. O. Address.
BRACKETT, Ph. D.	Princeton.
N GAUNTT, M. D.	Burlington.
E R. VARICK, M. D.	Jersey City.
HUNT, M. D.	Metuchen.
ORN, C. E.	Middletown.
WATER, Att'y	Elizabeth.
)ENNIS, M. D.	Newark.

	C. F. BRACKETT, Ph. D.
	EZRA M. HUNT.
; Clerk	E. A. OSBORN.

1119

ASTOR LIBRARY
MAY
9
1851

EPORT OF THE SECRETARY OF THE BOARD

o *His Excellency, George B. McClellan,*

GOVERNOR:—On behalf of the State Board of Health of New ersey, I have the honor to present to your Excellency a brief rvey of the work of the Board for the past year, and such companying statements, papers and reports as bear upon the tal conditions of the people. The increase of duties assigned us by the last Legislature, the formation of very many new cal Boards of Health, the occurrence of several endemic dis-ses and the inquisitive spirit manifested as to various mat-rs of health administration, have required, as never before, ir active attention. The law which requires local Boards of ealth to be formed, has resulted in a large increase of interest local health administration. Subjects of the utmost impor-nce to our citizens are thus locally discussed and public opinion educated by the information which is sought and secured from arious sources. One of the designs of this Board has for e first time been fully realized, the past year. Its advice as been sought in many measures of local interest, so that the rvice the State is thus doing has come to be appreciated, both the interests of health, and the prosperity that so much pends thereupon. The local reports we are receiving, enable to estimate the general condition of the population, while the tal statistics are giving us records of precision as to the urses and causes of disease. In nearly all the localities that st need it, there are now those who have an intelligent nviction of many things needing to be done, and who are king to make that public opinion, which must ever pre-ed, or to a reasonable extent accompany, legal enactments. undations are being laid for a careful, systematic and faithful ministration of those public affairs which have to do with the st vital concerns of our population.

While we have to regret the occurrence of some endemic diseases of a fatal character and a wide-spread extension of periodic fevers, yet the prevalence of serious or fatal disease was much less than for the period of our last report. The returns made up from July to July of each year show a less number of deaths by about twelve hundred than the previous year. While localities have suffered, there has been no wide-spread, fatal epidemic. The study of health questions is becoming organized into a system. From many of our cities and from some county and village localities, we have evidence of a comprehension of the necessities of a close watchfulness over the causes of disease, with a view to their prevention or abatement. It is no longer viewed as merely a professional matter, but as one which concerns the industrial welfare of the people. The advice of the Board is often asked in matters of local health administration, and we have thus been able to aid local authorities. We are now fairly in the position for a comprehensive oversight of the health interests of the State, and will be able to indicate how those evils are to be guarded against, which most imperil the life and health welfare of our citizens. Much information in this direction is diffused by the annual State report, as well as by personal correspondence and other agencies which we are able to promote. The library of the Board now presents a good outline of the various subjects of sanitary science and art, and we trust ere long to make it more extensively accessible to the people. Specimens of maps and other appliances also serve as models for the work necessary to be done by many of our cities and some of our closely settled rural districts. The wide duties imposed under the present law have brought us more in contact with localities and enabled us to indicate the most pressing wants. Requests are frequent for the presentation of these subjects to public attention, in connection with Teachers' Institutes and by Local Boards.

It has been our plan, in connection with the report of the secretary, to fully consider some one of the more prominent prevailing diseases of the State. Last year periodic or other malarial diseases were considered.

DIPHTHERIA

Has been, for several years past, so prominent and fatal disease in this State, that it merits our most careful and quisitive investigation. It has taken its place as fourth in the nglish list of zymotic diseases and is equally prominent in our n bills of mortality.

The order of diseases known as *zymotic* gets its name from the reek word which means "causing to ferment," because such dis-ses were regarded as somehow allied to or as cperating through ch a process. While we cannot accept the term as defining e modus operandi, there is need that the various laws of rmentation be studied as in nature, as allied yet distinct and related to animal or vegetable organism. Also that we study pecially putrefactive ferments or putrefaction as distinct from ual fermentation, since it is toward the latter that many of the motic diseases seem to incline. "There are two species or oups of fungi, the yeast or ferment plants, and the putrefactive ngi which are developed during the process of putrefaction." rkin, p. 29.

As these diseases are alike, in that they are believed to pend for their inception upon infective particles derived from thout, such questions as these are opportune.

How can the production of the infective be prevented? If t prevented, how can exposure to it be avoided or lessened? there must or may be exposure, how can the sedation or ation of the particle in the human system be hindered or barrassed? If likely to find some local lodgement, how can e part be put in such a condition as to fortify against it?

Or can there not be some substance introduced into the ood or secretions and for a time maintained there, that will nder the system refractory to the process which the infective rticle would otherwise set up, and which thus constitutes the sease?

If the gravity of the disease depends upon some chemical or composing changes which could be held in abeyance, or on e rapid multiplication of vegetable or animal organisms, hich mechanically or otherwise cause a higher life to succumb such prolific invasion, is it not possible to prevent the set-g up of such processes by antizymotics or antiseptics.

The discussion of these points, however pertinent to any one of these diseases, can not now be entered upon at length, but they are to be thoughtfully borne in mind. If the ideas entertained by us as to these epidemic diseases, and their possibility of limitation and prevention by individual sanitation are correct, the future success offered to medicine is as much beyond the one limitation of small-pox as the application of a general life-preserving law is beyond the prevention of only one disease.

Diphtheria first found its record in the registry of the Registrar General of England, in 1855, as separate from scarlet fever, of which it before had been recognized as somtimes a complication. About the same time it began to attract attention in this country by an occasional outbreak. The first article as to it in the New York State Medical Transactions was in 1859.

In a full report of the diseases of Newark for the year 1858, in the New Jersey State Medical Transactions, it is not named.

In January, 1859, the reporter for Essex county says: A few sporadic cases of diphtheria have occurred, "some fatal, all very severe and demanding very careful treatment."

The State report made January, 1861, says: "The reports received by the committee notice, in every case, diphtheria as epidemic to a greater or less degree. It has been most prevalent in Essex, Hunterdon, Cumberland and Gloucester.

Ever since, in varying degrees of prevalence, it has found its place among the most serious yearly diseases with which we have to contend.

The number of deaths cannot be accurately stated, as returns from localities were often defective. Under the recent law, the more completed registry shows eleven hundred deaths from July 1st, 1878 to July 1st 1879, and the vital statistic report shows the deaths from July 1st, 1879 to July 1st, 1880. It far exceeds at present, in fatality, any of the communicable zymotic diseases. It is universally recognized as belonging to the class of ailments dependent to a large degree upon preventable causes.

Whether it is an old disease, reeurring in its cycle, or recurring because, by other methods, we are imitating the filth of ancient civilization and over-crowding, it is not easy to determine. The general view is that it is the recurrence of a disease heretofore

ribed. In the identification, we find many descriptions of throat which are only analogous and strained into identity. is no more surprising a thing that a new disease should ır than that a new chemical compound should be discovered, hat life under new disturbing conditions should functuate ed phenomena. Although finding mention in the supple- ıtary table of the causes of death in England in 1855, it does receive extended notice from General Graham until 1858.

Diphtheria," says he, "according to the popular theory, is bred 'rance—where the conditions are more favorable on the whole n they are in England—to the diffusion of putrid effluvia r the fauces.

Every Englishman admires the works of art, the picture gal- es, the houses, the furniture, the cultivated personal tastes ich surround him on every side in Paris, or on a small scale Boulogne; he admires some of these objects every day, others ry week; but has every day to give up his admiration at the ır of that inscrutable *cabinet*, where the light of French nement never comes; where his throat is assailed by the sonous distillations that engender disease, and explode—if ı count well the victims—with much more fatal consequences ın gunpowder, or even than fulminating quicksilver. That n should lock up jewels in cabinets, keep their larders full of icacies, or stock their cellars with wine, is natural; but it is a sin- lar absurdity in civilized countries for men to attempt to hoard years this volatile essence, which bursts its chains, and, like an clean spirit, enters not only every apartment in the house, but ry channel of access to the living chambers of the body, ving at times such traces of its passage as diphtheria in the oat.

The disease once generated, wanders abroad and destroys life der circumstances quite different from those in which it was n; but impurity is always its natural ally.

The Scotch threw these matters into the streets, and justly urred the censure of the fastidious.

In London, and even in the country mansions, retreats still exist ich may rival the French magazines of impurity, but it has recent years, been the practice to throw the guano compounds London, with water, into the sewers; which, though not construc- for the reception of such matters, and consequently suffering

their volatile principles to escape into the streets, convey a portion of their elements to the Thames, and commit them to its flood of tidal waters.

Dr. Barker has recently performed an ingenious series of experiments on animals, to determine the effects of each of the noxious principles which arise from cesspools. He placed the animals in a close chamber by a cesspool, with which a tube opening into the chamber communicated; and a lamp was arranged so as to draw a current of cesspool air steadily over the creatures inside. With a pair of bellows, Dr. Barker could draw the air from the chamber.

A young dog in half an hour became very uneasy and restless; he vomited, and had a distinct rigor, and in the course of a day was exhausted.

When he was removed he soon recovered. "Another dog was subjected to the cesspool air during twelve days; in the first seven days he underwent a series of sufferings, not unlike the symptoms of the diseases of children in hot weather; on the ninth he was very ill and miserable." After he was liberated, on the twelfth day, he remained "very thin and weak for six weeks."

Dr. Barker then continued his experiments on the effects of definite doses of the gases in the sewers, and killed or poisoned several sparrows, linnets, jackdaws and dogs.

Thus, Dr. Barker has, for our instruction, imitated on a small scale, and on a few of the inferior animals, the vast experiment which is constantly going on, and destroys thousands of men, women, and children in all England.

Instead of a few animals in a close chamber, more than two millions of people live in London over sewers and cesspools. The poison is generated in every house; it is distributed conveniently along all the lines of road, so as to throw up its vapors into the mouths, throats, and lungs of the people through innumerable gully-holes, which are either left untrapped or trapped imperfectly, in order that the poisonous gases might escape. A variation in the pressure of the atmosphere draws up the stinking air from the sewers, like Dr. Barker's bellows.

All the details of the experiment were as carefully contrived by the engineers of the old sewers' commissioners, as if they were constructing an apparatus for passing currents of poisonous

steadily over the people of London, with a view, like Dr. ker, to ascertain their exact effects.

he engineers of the new Board of Works have endeavored to) the apparatus in order. It is now time that this cruel ɔriment should cease. Last year, when no epidemic pre- ed, not less than 14,795 unnatural deaths were registered London. This was the aggregate effect of the impure airs, of other sanitary defects."

he criticism is severe but in many regards sustained by tinued experience, and still applicable in this country.

ince these utterances were penned very many attempts have ı made to identify the "infective particle" of diphtheria, or efine the precise conditions under which its exciting cause enerated. It is not surprising that science and art should fail to identify it, but this does not vacate the value of much wledge we have acquired as to this disease. It is distinct ı the usual eruptive diseases and has a marked septic char- r.

ach year has given increased conviction, that it does not, r having been started from a focus, acquire epidemic ralence without the aid of foulness derived from house- l conditions. It is still a careful study with physicians ther it has chiefly to do with putrefaction and excretal rges—especially the excretion of human beings—whether it es from sewers or from refuse from which all human exe- ion have been excluded, and how far dampness or excessive nant moisture may cause the special production which gives to this disease. Although more than most of the crowded- diseases, it prevails in the country, yet when thus occuring frequently fostered by local conditions, or its introduction be traced to a foul source.

yndall has shown that the countless myriads of motes that seen dancing in every sunbeam are organic particles, and among them are zymotic bodies which are germs of disease. se bodies are in concentrated force in the rooms occupied by ons suffering from such a disease as scarlet fever and we always to seek dilution, ventilation and isolation.

'e can therefore emphasize a sentence already quoted— e disease once generated wanders abroad and destroys under circumstances quite different from those in which

it was born; but impurity is always its natural ally." [illegible] the congener of its development is a sporule, or an animalcu[illegible] or only an undefined molecule, it may light upon any so[illegible] but if surroundings are good and the person in good conditi[illegible] of life, the rule will be that it will seldom display vigor a[illegible] virulence, and under such relations can never acquire epide[illegible] momentum. Where there is large production of infecti[illegible] material from excessive and extended foulness "we may co[illegible] ceive the different kinds of zymotic matter distributed i[illegible] clouds," and that like strata of air or emanations from factor[illegible] these may have their floating direction governed by specif[illegible] gravity by trees, by winds, by the humidity of the atmosphe[illegible] and thus different localities be differently exposed. But b[illegible] assured where the local conditions or those of the individu[illegible] are favorable—there the chief outbreaks will occur.

So far as diphtheria is concerned, the present showing a[illegible] summing up of all evidence is that it takes its place among th[illegible] diseases nurtured by filth incident to human habitations, upo[illegible] moisture and heat co-operating therewith, and that the fir[illegible] principle of its limitation is to avoid these. While it is some[illegible] times derived from persons, or conveyed by things, and thu[illegible] communicable, the weight of opinion is that it at times spring[illegible] up as a product amid unsanitary conditions, without a previou[illegible] case or emanation therefrom.

Next, it may be said that it is not believed that diphtheria occurs frequently, if at all, from impure water, as do some of the zymotic diseases, or that it is especially conveyed by the discharges, as is believed as to cholera and typhoid fever. It is more essentially a foul air disease. It is also one of those foul air diseases which is believed especially to choose the fauces and surrounding membrane for its first display of unhealthy activity. "It thus infects the moist surfaces of the throat," and is conveyed into the lymphatics, and reaches the blood; many regard it as local, before it is constitutional in its action, and believe that protection is afforded by avoiding open inhalation through the mouth and by protecting the surface of the throat, from its sedation by astringent or antiseptic substances.

If, however, the blood is primarily or contemporaneously affected, prophylaxis now seeks to put it in a condition unfriendly to the setting up of the disease process. Barker speaks

e anti-hyogenic effect of quinine. Laudor Brunton in his work on "pharmacology and therapeutics" says "facts all to point to ferments or enzymes as the agents by which the es are built up or pulled down." * * The action of s upon these is becoming one of the most interesting ques- in pharmacology."

is claimed by many that "diphtherite" as a process is tor in many diseases and, that what we call "diphtheria" ıly distinct in that it manifests itself so primarily as to this specific name. Thus Martin, of Berlin, after defining liphtheritic process as consisting of a "fungous formation ıpores of which are seen under the microscope to pene- not only into the tissues but within the blood vessels ucing in the way a generalized disease," claims that even uerperal fever this is the predominating element. Diph- tic deposits have been long recognized as occurring in et fever, measles, etc. It is not certain but that we are ıudy classes of disease and their allied traits much as botonist does plants—which, although quite different, ıdmit of association and of explanations even when great ıtions of type or hybridisms occur. Diphtheria as less traceable to antecedent cases, as well defined in its prom- t symptons and as traceable in some of its blood and tissue ges, may well form the nucleus for close study into the ogy and prevention of zymotic diseases. Cleanliness, lance of all putrefactive decompositions, attention to the ld or fungoid producing moisture of foul air and foul water ıildings and preventive treatment of individuals are capable eatly diminishing this insidious disease.

LOCAL EPIDEMICS, ETC.

the enteric or typhoid fever at Princeton, the periodic and r malarial troubles of Bound Brook, and the small-pox of den, we have this year had three typical and impressive nders of the evils that can result from avoidable diseases.

ıe mournfulness of death in educational institutions among ı in the vigor and promise of early manhood; the depression ı entire population, and much suffering among the laboring es, and the excitement of a loathsome contagion have each

in their way shown how melancholy and how pecuniarily unprofitable are the self-imposed burdens of avoidable sickness.

As the sickness at Princeton is made the subject of a separate paper we need not enlarge upon it here.

PERIODIC FEVERS OR "MALARIA."

In our last report, pages 18—25, under the division of Miasmatic Diseases, we gave special attention to that prevalent form of disease, whose periodicity is most distinctly declared in the form of "chills and fever."

It is unfortunate that the terms malaria and miasm, as frequently used, do not convey any distinct idea of the disease that sought to be designated. In the nomenclature of the Royal College of Physicians, London, as reproduced in the United States Government publication, of the "Nomenclature of Diseases," which has been accepted thus far as the basis of our nosology, the term "Miasm" does not occur, and the term "Malarious," only as a definition of "Remittent Fever," a fever characterized by irregular repeated exacerbations, the remissions being less distinct in proportion to the intensity of the fever.

In the classification of the Registrar General of England under the class of zymotic diseases miasmatic diseases are named as Order 1st. Under the order are associated nineteen diseases, the last being left indefinite under the title of "Other Zymotic Diseases." Ague and remittent fever appear as 16th and 17th in the list. In this classification miasmatic is used as the name of an order in its etymological and general sense, as meaning "a noxious particle or substance or exhalation floating in the air," which has become a cause of disease. Physicians when rightly using the term "malaria" do not use it in its derivative sense as a term for foul air in general, but as denoting "an exhalation from marshy districts producing fever or disease of an intermittent or remittent type." "It is believed to be the product of organic decomposition in soils," in which heat and moisture are important factors. From the fact that it seems to be generated in the greatest amount in marshes containing vegetable organic matter undergoing disturbed or uncompensated decomposition, it is often called marsh miasm.

While the term "miasmatic" may be employed to denote a

forms of "foul air" or "infective particle" diseases, the term laria" should never be used in the lax sense it is by the y and by too many physicians. If it is to mean anything inctive and descriptive it must be confined to the class of ases to which we have referred. There is increasing evice that this malaria produces its own specific effects, and that great degree its production is due to causes which are within range and the duty of human control.

Nature has its own processes of decay and its own compensas, so that the undisturbed great Dismal Swamp of Virginia, for ance, is not known as a cause of malaria. But when art stitutes something else for the exuberant vegetation of ure, or impedes natural water courses, or adds to the products ecay, or disarranges the relations of heat and moisture thereto n any other way introduces its own methods, we must see to it we provide for the changed conditions. It is now well underd how decomposition, the level of ground water and the t of the ground, can be affected by artificial methods, how, re there cannot be immediate relief, we may prevent exre and how we may fortify the system against attack.

is fast coming to be understood by our leading students of al science, how neglect or remedy of evils that affect public lth bear on the financial prosperity and general condition of people. Much more is now known as needing to be done n is executed. The causes are abatable, although sometimes icult of abatement. The time is not far distant when land water rights and privileges will need to be guarded in interests of public health, for the public good, just as prop- is taken for railroad and other improvements. While the t forms of law and adherence to public rights must ever be gnized, regard for the general health must be held equal to exercised for other material interests.

ever, more than in the last year, has evidence come to the rd, that malaria is dependent on local causes, which to a t degree admit of abatement. The mildness of the last ter, and the unusual heat and dryness of the spring months n to have stirred into unusual activity the processes of vegle decomposition, and so in many places to have added to the alent sickness.

arious localities in the State have given new evidence of a

continuation of unhealthy emanations long since realized. We have no experience not common to parts of other States except that our rapid growth, our centralization in towns and our many works of public improvement, cause more disturbance of natural conditions. Cities like Camden and Burlington have been greatly relieved as to malarial tendencies by improvements in drainage, while other cities have increased rather than diminished their impediments to a dry and cleanly soil.

Ewing township, in Union county, appealed to us in a case which seems plain. An unimportant saw mill site is the cause of the inundation of a considerable section in the township. On an appeal made to us by the Board of Health of that township we made careful examination of the district and also secured facts in detail as to the sickness and its localities. These were furnished with great precision and with corroborative evidence. At a meeting of the Township Board, held in Trenton, full conference was held with the Secretary as to the means to be used for relief. It is recognized that some defect exist in our laws as to the securement of drainage for health, and is believed that where clear evidence is afforded of prevalent damage in this respect the law should provide means of relief.

The following is part of a letter received about the same time from the Cashier of the Bank of New York, resident at Belleville:

NEW YORK, July 23, 1880.

A. W. ROGERS, M. D.,

President of the State Medical Society.

Dear Sir:—Having lived for several years at Belleville, and suffered from malaria in my own family, I have been led to observe the influences which produce or aid in the dissemination of malaria, and I have observed that the prevalence of disease of that nature, (to a large extent), depends on the condition of the water in the various mill or factory ponds. And I have observed that the drawing down or emptying of the ponds for repairs to dam or other purpose, during the summer time, has been followed by a wave of chills and fever or typhoid. Last season the old Birds' mill pond, (you may know it), was drained during the hot weather, that the Newark Aqueduct Board might lay their pipes across. Immediately after, the lower Hendricks pond was partly emptied to repair the Montclair Railway bridge; the effect was evident in increase and spread of malari

orders. Two years before, the upper Hendricks pond was
ptied and the locality of Montgomery was a prey to malaria.
ere is no doubt in my mind that the improper use of the
er-courses and ponds is largely the cause of the reputation of
w Jersey for malaria &c., and it does seem to me that it is a
per subject for legislation.

BOUND BROOK.

he condition of the beautiful village of Bound Brook has
me so well known, that we are in no danger of injuring its
interests, by speaking plainly of its deplorable experience.
ut July 27th, we received the following note from one of its
sicians:

EZRA M. HUNT, M. D., METUCHEN, N. J.

y Dear Doctor:—Bound Brook is certainly in a very un-
thy condition. On Main street there is but *one house* which
pes from malaria in some form—and this is simply a fair
ple of the whole town. Chills are frequent—fearful neu-
ia more so—but the fever predominates. The street on
:h I reside, the best drained and located on a small hill, I
ot believe one man, woman or child escapes, except by leav-
town. When I say I believe, I mean I have been unable to
a single exception to the statement. Now my object is to
f I cannot persuade you to visit this place, show you its
ue spots and see what can be done for it.

Respectfully yours, &c.,

C. M. FIELD, M. D.

)UND BROOK, N. J.

visit the subsequent day and a careful examination, not
of the one chief marsh, but of all surroundings convinced
hat there were local causes of disease of the most serious
acter. Changes caused by the alterations of roads, building
ilroads, gradual obstruction of water-courses and the accu-
ition of decayed and decaying vegetation had attracted
ition before. The previous summer, the increase of inter-
ents and remittents had been so great that complaint had
made before the grand jury, and before the sickness of this
ner, an indictment of the chief marsh as a nuisance, had
made.

t long after our first visit, the State Board of Health was
l to be informally present at a meeting of the Township

Board of Health and of the citizens, held for the purpose of producing evidence that might satisfy the Township Board that this marsh needed to be reported by them as a nuisance. Although it was not necessary that our Board should formally meet, and as at this stage of proceedings it had only an advisory and individual relation, three or four members of the Board were present.

The proceedings were conducted in a deliberative way and full opportunity afforded to get at the facts as to the prevailing sickness and as to its causes.

Every physician of the town testified to the due extent of the evil and agreed as to its causes. The most prominent citizens declared that unless there was an abatement of the evil, property interests could not induce them to remain as residents.

Whole families of laboring men prostrated, business paralyzed, all that could get away seeking relief by flight, and a kind of testimony irresistible, both as to the facts in evidence and the character of those offering it, made out a case of malarial poisoning so oppressive and universal, as to furnish such a typical example of concentrated malarial poison and of its saturating effects as deserves to form a whole chapter in the future history of periodic fevers, due to localized and artificial causes. Gen. Viele, after a careful inspection of the whole precinct, declared it to be the worst exhibit of a malarial manufactory that he had ever witnessed, and worse than anything known this side of Africa. Assertions that had seemed to us extravagant were fully verified by what we saw and heard, so that I believe every member of the Board felt fully convinced of the severity of the visitation and the reality of its alleged exciting causes. Even in July, all through the pond, there were patches of dead vegetation, not even the water lily being able to withstand the alternations. The mild winter, the heat of early spring, the alternation of water and of exposure of the bottom of the marsh, with its decaying mass, to the action of hot suns, made an effluvium so sensible at nights, and often in days of humid atmosphere, as to be fully certified by the community at large. It was a "macerating reservoir of vegetable substances, causing those pestiferous exhalations to which intermittents in all their grades and varieties have been obviously traceable." While no doubt other evils exist, this marsh and its tributaries

ere the chief cause. While this does not inculpate the present wners, since they do not seem intentionally to have created the vil, yet it did show that the equity of law should somehow each the evil before another summer comes.

The local Board of Health, under the act of March 12th, 1880, eclared the mill-dam a nuisance, and ordered its removal in ovember. In the meantime, a second complaint was made be- re the grand jury of Somerset county, and a true bill found. he case came up for trial at the fall term and occupied the court Somerville for ten days. It will ever be a notable trial in e history of New Jersey sanitary legislation. The owners of ie land made a most vigorous defence, with the aid of some of ie ablest counsel of the State. The Prosecutors showed a uni- ersality of sickness such as we believe has never been exhibited n any such trial. No person of the vicinity could be found to estify exemption. On the former trial it was shown that one man had not been sick, and that an old man and his wife, who usually retired soon after sunset, had escaped. On the second rial it appeared that these three had since all been down with remittent or intermittent fever. Attempt was made to show hat the malaria at Bound Brook was a part of the general preva- ence of this malady; that there were other operative causes; hat the water of the pond was not harmful, but that the wells night be. The verdict of the jury sustained the indictment f the grand jury. The case fully shows that law must in uch flagrant cases protect the health of the citizen, and that ven ownership in real estate is not so precious as the lives f the people. As it is desirable that no private property hould be confiscated without award, and also that it should ot become a public nuisance, we submit, that drainage for ealth should be recognized in the State of New Jersey. The aw does not hesitate to provide for drainage of land for bene- its to agriculture, or to condemn one's private property when t is wanted to build a railroad, or to widen its tracks. This is ight. But it is also right that under the same restrictions, or he same provisions for equitable appraisement, mill-dams or narsh lands, which are notably unhealthy, should admit of imilar condemnation, under provisions fair alike to owners and o the general public. Surely the public interest requires that vhole communities should not be prostrated as a result of such

artificial marshes as that which fully suspended the prosperity of this growing town.

The defendant was directed to abate not only the mill-dam, but to remove all the obstruction that had caused the nuisance. And it is being promptly abated. The details of the trial, the evidence, the pleadings, and the charge of the Judge, are worthy of permanent record.

There is very great need, in many localities in this State, of drainage for health, and there is need of such legislation as, while it guards personal rights, should make it as possible in behalf of the public health for the Supreme Court to condemn land for this, as it is for other public interests.

Extracts from the reports of local Boards of Health will indicate various localities where "malarial" diseases have occurred. While climatic conditions have favored so wide-spread a prevalence, it will be found that many localities have been exempt, and that those regions have suffered most which have long been recognized as in the vicinity of unhealthy swamps or low grounds, filled with vegetable refuse.

We also call attention to one of the reports from a local Board, of a peculiar endemic fever which occurred near Blackwoodtown, and is believed to have been caused by putrefactive composts, brought there for fertilizing purposes.

See reports of local Boards.

THE ELIZABETH NUISANCE.

Early in the year our attention was directed to a nuisance that existed between Elizabeth and Elizabethport, in the case of an establishment for the recovery of sulphuric acid from the refuse liquors left in the refining of kerosene oil.

In the separation of the kerosene much sulphuric acid is used. The thick liquid left consists of various nauseous hydrocarbons or complex oils, in connection with the sulphuric acid. The whole is known as "sludge." This was brought to a dock and transferred to vats and retorts, and by a crude process and by imperfectly conducted works the acid was separated. The result was that the fumes of sulphuric acid and a floating vapor, composed of various of these petroleum compounds, was diffused a great distance. In certain states of the atmosphere it

did not seem to mingle with the air, but to be carried along through it as if a distinct and unmingling substance. Recently an author has attempted to show that the reason of the heavy fogs of London is partly to be found in the fact that the similar atoms given off from various factories become coated with an oily pellicle and so are prevented from oxidation and from ready mingling with the atmosphere. Whatever may be the reason it is certain that some vapors do not readily submit to atmospheric dilution and are to be studied as to their resisting constituency.

At least it was certain as to this vapor that it was a great annoyance to the whole district in which the distillery works had been started. In very many, beside discomfort, it produced a sensation of oppressive breathing and nausea, and it was claimed that in others it caused headache, diarrhœa and other serious sickness. There was the usual difference of view as to whether it was absolutely harmful, and at one time it seemed as if a long litigation would ensue on the point whether it was a nuisance injurious to public health.

Although the present English law, in its definition of a nuisance injurious to health, includes such permanent odors as unpleasantly affect large masses of people, and are found to nauseate or distress large numbers of persons, yet our own courts have heretofore been exact in their requirements as to proofs of actual evil effects to the human system.

But the case in hand illustrates the present tendency to pay due regard to the public health, to consider all alleged interferences therewith. Public opinion was earnest and outspoken in condemnation of the evil. The physicians of the district very unanimously expressed their opinion that the vapor was unfavorable to health. The Secretary of the State Board of Health was requested to make a full examination of the works and an inquiry into the effects, and of the vapor.

At the same time an indictment was sought from the grand jury, and an injunction from the higher court. The case was fully presented and finally an indictment secured.

The Chancellor also appointed an expert commission for the purpose of examining into the alleged nuisance, its effects on public health, and whether it could be remedied so as to permit the continuation of the works. The result of the examination

was such as to satisfy them of the imperfection of method and the evils arising therefrom.

The owners are experimenting on methods, in order to satisfy the committee of experts. The nuisance will be abated. The case seemed to illustrate three or four important points:

I. The power of intelligent public opinion, when it is freely expressed, is persistent and adapts right methods for the accomplishment of its object. Much failure in removing nuisances that is attributed to the imperfection of law, is due to a defective public opinion, a feeble or defective expression of it or a resort to methods which are unwise and indefensible.

II. The tendency of law to conserve the interests of public health. The case was acknowledged to be one difficult of proof by the closest tests of chemical analysis, or by testimony as to the effects of such vapors in dilution. But the exact testimony of personal experience was found to be definite enough to overcome all this. Although some of the decisions of courts, several years since, seemed discouraging as to the definition and abatement of nuisances, it is evident that now both public opinion and law incline to regard the protection of the public health as a frequent and definite duty of the State. The Attorney General in his opinion on a law passed by the last Legislature and referred to him for direction as to one of its clauses, after giving a construction thereto, governed by the intent rather than the technical wording, says: "If the law was not a sanitary measure, it might be questionable whether it would bear such a construction." The same spirit is manifested in both State decisions and municipal ordinances. Law is both being made and executed which, while regarding private rights, recognizes the fact that the health of the people is a supreme law.

III. It showed how crude and imperfect are many of the processes now carried on to the discomfort of the public.

The so-called factory was little more than a series of vats and retorts placed out of doors, with only a shed over them, in which not the least attempt was made to absorb or burn nauseous emanations, or to conduct a chemical process with some regard to public comfort. This was not because the evil did not permit of remedy, or, at least, of abatement, to a large degree, but because the parties did not know of the best methods, or did not care to incur the additional expense. The Local

overnment Board of England has recently, through Dr. Balrd, made a most able and elaborate report as to the best method conducting those manufacturing or chemical processes, which e apt to cause nuisance. It has been shown that these tradecupations now admit of clear and safe conduct, and that ils arise chiefly from defects of apparatus or supervision. lready our chief routes to New York City are tainted with uestionable smells, and the refuse factories which are driven om the cities of other States, find refuge within our limits. e must insist upon it, either that such establishments are not aced in our midst, or that they be conducted according to the ethods consistent with our proper comfort and health.

IV. The vapor and odors from this factory illustrate how, otwithstanding the true doctrine of the diffusion of gases and e power of the air as an oxidizer or deodorent, there yet may circumstances in which mists, vapors or organic particles ay be carried unchanged for long distances and be capable of ercising their own peculiar influences. It is known that the lorous particles from this factory were at times recognizable veral miles distant. After having heard statements as to its cognition at Cranford and at the docks at Perth Amboy, we ad a still more convincing experience. Three weeks after my wn visit to the works, on a day when the wind was east, with he damp, sleety atmosphere of an approaching snow-storm, I erceived the odor distinctly on an inland road between two oods, a distance of twelve miles from the spot. On this ccasion and at two subsequent times, in similar condition of ind and moisture, it was distinctly perceived by several at a listance of eleven miles, and the odors described by those who lid not know from whence it came. There is accumulating vidence that in certain conditions of atmosphere waves of apor may move in invisible strata for distances much greater han once conceived. It is not improbable that when a contaion has become greatly multiplied in one spot, it may thus be aised and float away from its own district, and carry its infective particles long distances and affect only those that come ithin its zone.

SMALL-POX IN CAMDEN.

About the middle of July information reached us through private sources that there were some cases of small-pox in Camden. An official inquiry, addressed to us by the National Board of Health, with information received by them, led me, on July 28th, to address to the Sanitary Committee of that city, a letter as to facts known to the Board, as to the need of more active measures in reference to this disease, and of more active exercise of sanitary police in general. The letter was kindly received by the Common Council, and referred to its Sanitary Committee. Other communications from private citizens, induced me soon after, to visit in person the City Clerk, of Camden, as the city official with whom the Board has official relations. We obtained from him such facts as made us urge upon him at once to communicate with the sanitary authorities, some of whom were absent from the city. August 16th, I received a communication from James H. Wroth, City Physician, asking me, on behalf of the State Board of Health, to meet the Sanitary Committee at my earliest convenience. I telegraphed for a meeting the next day.

It proved to be a conference with the Sanitary Committee of the Council, and with several of the leading physicians and citizens. We spent the afternoon in a thorough inquiry into the facts as to the spread of the disease, and its localities. It was admitted to be on the increase each day, and also that adequate means had not been devised for its check. Without undue criticism of the fact, it was the accepted view that all should, with rapid promptness, co-operate in the adoption of those means which were advised. August 22d, our Board received the gratifying evidence that very active measures had been already taken, that new supplies of vaccine virus had been secured, that a system of isolation and vaccination was being followed with satisfactory results. Reports to the Board showed thirty-eight cases in the hospital, sixty cases in the city, and many persons exposed. The conference was otherwise valuable as directing attention to various other defects in sanitary administration, and in securing the initiation by the sanitary committee and others of a plan for more effective sanitary care.

Small-pox is so far a preventable disease that we need not

re report the thousand statements and arguments already in int as to the means of isolation of every occurrent case, and such vaccination as will deprive the disease of material for tack. Clearing up the rear yard and using disinfectents is ry good as a general cleanliness and is primary in case of me epidemics, but isolate and vaccinate are the primary ings to do in impending small-pox. By our present methods out every seven years we raise a population so unprotected rough neglect of vaccination as to give sure and hardy soil r fertilizing and propagating this disease. So long as we rsue this plan, we shall continue to have, every ten years, cuniary losses (not to speak of lives) from small-pox, more than uivalent to what it would cost to vaccinate gratis the entire owing population.

Now that bovine virus is so easily procured and those who ar contamination from other people's children may be vaccited from safe sources, there can be no possible excuse for an idemic of small-pox. It is a reproach to our civilization, an idence of a corrupted taste for eruptions and disfigurements, a ensign of carelessness, or a proof of original sin too actual for gument.

While other methods than those of compulsory vaccination ay be expedient, yet our laws should go far enough to reain those who by their neglect endanger society, from tendance on public schools, from leaving houses that are incted, or from exposures of the life and health of others until uch time as vaccination has been performed or the danger has ased.

KEROSENE EXPLOSIVES.

In the second report of this Board, pages 16–22, attention was rawn to the dangers to life resulting from illuminating oils. In iew of the facts in evidence, it was claimed that some legislaon is needed on the subject.

Last winter a bill was presented, which, while it sought to ecure regulation, was not, in all its parts, such as the Board ould have approved. The need of exact legal enactment as to he subject, is being made more and more apparent by the freuency of accidents. These oils are more largely used each ear, as we find by the statements of dealers in cities where gas

can be had. Their use necessarily falls under the charge of those who are not always intelligent or careful. Some of the accidents occur in the designed use of the oils. Others result from attempts to fill burning lamps or to light fires. While this use is to be censured, yet many of the accidents that occur in such cases would not take place were the oil of standard purity. During the last year we have heard of an unusual number of these accidents and have reason to believe that the sale of low grade oils is increasing. It is to be remembered that such oils, especially in summer, give off gases which mixed with common air are highly inflammable. Many a half full can or lamp or a partly filled barrel has this volatile and inflammable gaseous mixture floating above the surface. It is not merely formed by the light approaching, but is there ready to explode if the light or fire happens to be brought in contact.

The following case which has come under our examination this year, will illustrate:

A girl of twelve years, living in the township of Raritan toward Perth Amboy, was left with a sick friend alone in the house, on a very warm May day. The fire was probably supposed to be out, but a few embers must have been beneath the wood she attempted to light. The can exploded and set her clothing on fire. The top was on, showing that she had only attempted to pour from the very small spout. She ran out of doors in a strong wind, and in five minutes fell on the grass and was dead before the farmer in the field could reach her.

On visiting the house, we found that the top of the can had been so violently separated as to leave the full mark of its rim on the ceiling, and so as to cut through deep into the brown plaster. Many spots of oil had been thrown here and there over the entire kitchen. A small amount of gunpowder could not have shown greater explosive power. On inquiry we found that the quart can had in it scarcely enough oil to fill a lamp—was in a warm closet, about fifteen feet from the stove. It was evident that the can always contained the explosive gases ready to set on fire the oil or anything that came within reach. Tracing the oil to the vendor we found it had been bought and sold by him as one hundred and twelve degrees test oil and was very largely in the market in most of the towns. It was tested May 17th by Prof. A. B. Cornwall, of Princeton, and he wrote as follows:

The sample of kerosene you left me I have tested to-day. It
ıes at eighty-eight degrees Fahrenheit, and burns (fire test)
ne hundred and seven degrees Fahrenheit. The tests were
le in a Tagliabue's open tester, with a thermometer by Tag-
ue, specially made for such tests, and showing single degrees.
reliminary test was first made and the oil was again tested,
ing the temperature uniformly from seventy-three degrees to
ıty-eight degrees in twenty-four minutes, and from eighty-
ıt degrees to one hundred and seven degrees in eighteen
utes more. The oil is unsafe."

n writing to the wholesale dealer in Newark, we received
following:

NEWARK, N. J., May 19th, 1880.

E. M. Hunt, Metuchen:

'EAR SIR:—Yours of the 18th received. We were not aware
; we were putting out oil at less test than branded. The oil
hipped for us from Philadelphia, and guaranteed to us to
ıd a test of one hundred and twelve degrees, and we guar-
ɜe to our customers this test. You will find on one of the
ds of the barrel the State of Pennsylvania Inspector's brand,
iz:

ıspected by Charles F. Miller. Guaranteed fire-test one hun-
l and twelve degrees, Philadelphia; and we supposed that
State Inspector's brand was a sufficient guarantee that the oil
ıld stand test as branded. In regard to the accident you
ık of, if one hundred and fifty degrees test-oil was poured
) a *burning fire*, it would ignite and explode just the same as
one hundred and twelve degrees, and all the accidents, or
ety-nine per cent. of them, happen from the careless use of
osene in just this manner, by pouring on the oil *after* the fire
been started; but we will give this our immediate attention
l thoroughly investigate it, and call upon you at your office in
w days. Until then, we remain

Yours, &c.

)n receipt of this, we again communicated with Prof. Corn-
l, who not only re-affirmed his former examination, but
med that 150° test oil poured on a fire, would not give such
ılts as we had found in the case. Further correspondence
not only to a visit from this firm, but from the firm in Phila-
phia, which had sold the article. None of these gentlemen
e personally intending to sell below the standard. The one
n Philadelphia frankly told me that such oil should never be
on the market, especially in summer. He even cautioned

the storekeeper against allowing it to be in the barrel on front platform in the sun. He said that the article was lar sold at wholesale at about seven and a half cents per gallon, that it was so nearly a bye-product, that it would not pay to a terate it with naptha. In half full barrels, or cans, or lamp hot days, an inflammable vapor could generally be found fl ing on the surface. One of the firm selling it here, after h ing what was said, filled his can with a different article. I of these large dealers said that the better class of whole dealers would support a proper law, although aware that t was concerted action against legislation on the part of s prominent firms.

Our experience in this case, the information given, and o inquiries, have made us feel that it is well nigh inexcusable for State longer to delay such restrictive and regulative legislat as the exigences of the public safety demand. Local He Boards in various localities are inquisitive as to their power reference to it. The Secretary of the Board of Health, of W ington, Warren county, instituted careful tests of the oils for in that town. The fifteen oils examined were none of t found even up to the "fire test," at which they were bought sold; some of them being more dangerous than others. On the worst was one sold as 150° fire test. The examinati made by Dr. Baird, and the conservative efforts made at cor tion, as detailed in the *Washington Review*, of July 2d, 1880, well worthy of general attention. We only ask that the rep ed admonitions given by accidents, which endanger destroy life, and by the united testimony of chemists and o experts, be no longer allowed to pass unheeded.

LOCAL BOARDS OF HEALTH.

The most important sanitary progress of the past year in State, has been the formation of about two hundred townshi city Boards of Health. In many of our townships are vill like Somerville, Bound Brook, etc., which stood in great nee Health Boards. Indeed, to make the Health Boards of la cities effective, there must also be some power of health adı istrated in the adjacent townships. Many of our cities found to have only sanitary committees and no adequate

ion for the mode of organizing Health Boards prescribed in
r charters. Many of these, like Camden and New Brunswick,
availed themselves of the new law to organize more
tive boards. The Boards organized through the State have
n four types, decided by the intelligence or executive capa-
of those who constituted them, or by the conceptions of
ential men as to what needed really to be done.
ne and the smaller class has organized merely because the
requires it, and assumes that their township is perfectly
thy, and really needs no Board.
second class, while not knowing of any evils, recognized
it is quite possible that such may exist, and so begins in a
per way to inquire into and study the needs of the district,
olds itself in readiness to consider questions or complaints
h may arise.
hird class, knowing something of the real needs, have, in a
ess, systematic way, proceeded with judicious regard to
ic rights, which circumstances justify. It is surprising
much some such have accomplished without recourse to
e measures, and how much the public sentiment has been
ated.
fourth class would attack every public and private measure
a zeal neither according to knowledge or according to the
and are distressed that the law does not give arbitrary
er.
was to be expected that in the start of such Boards there
ld be incomplete knowledge as to needs, and crude views as
ethods; but a review of the whole evidence will show that
whole these local authorities are doing, or preparing to do,
tive work.
township which at the first wrote that they needed not to
nize, was among the very first to find itself invaded by a
ance from an adjacent city so pronounced as to call for
vity.
We have numerous correspondence which shows how the
rest of the people has been aroused, how evils are being
mined, and how much room there is to believe that the law
l be salutary, as much by the information it will spread and
the evils it will prevent, as by its exercise in those cases
ere positive orders or legal action are required.

In many districts the first step is to secure a thoro acquaintance with the character of soil and underlying st tures, with water courses natural and artificial, with obst tions to natural change or artificial aid—with the contou topography of the district as secured by sanitary map—v well and water supply—with cellars, house drains, cesp privy vaults, both as to their kind and proximity, and v prevailing sickness and its localities.

A brief paper in this report by the President of one of t Boards will present some outline of the feasible work t done by such Boards. Abstracts from some of the rep received and references to their organization will giv good idea of the local interest which is being manifested. have abundant evidence from various portions of the S of important preparatory work in the interest of public he

This Board has been more frequently consulted the last than in all previous years of its existence. While only see to be advisory, it has a sphere of usefulness constantly enlarg and by counsel and advice has been able to give direction t portant sanitary movements.

THE NEW JERSEY SANITARY ASSOCIATION AND LOCAL ASSO TIONS.

The New Jersey Sanitary Association has proved itself a v able auxiliary to the work of this Board, and aided in awal ing public attention to sanitary matters. Its recent meet held in the city of Elizabeth, excited much attention and papers read were of great importance. The press throughout State has largely disseminated the information furnished.

The West Ewing Local Association is formed on the New plan and conducts sanitary inspections of the entire towns It has recently published a volume of its proceedings, and n well be consulted as a model of what a rural community n do in appreciation both of public health and local thrift.

The Sanitary Association of Elizabeth has been active a useful, and succeeded in awakening local attention to hea matters. In several other localities we have been made aw of local voluntary organizations which are aiding in givi shape to health administration.

SANITARY MAPS AND THE HUDSON COUNTY SURVEY.

our last report we noted the fact that arrangements had nade for a sanitary survey of those parts of Hudson county bore relation to New York bay and harbor. This included ies of Bayonne, Jersey City and Hoboken, and the thickly l portions of the county adjacent. The survey was under- with the aid and direction of the National Board of h. We were able to command the services of excellent ers, and the assistance of others who had to do especially anitary inspection and vital statistics. The sanitary map ilmann & Brush, of Hoboken and Jersey City, and that of s. Eddy & Carrigan, of Bayonne, are specimens of correct- nd execution to which we would invite the attention of all

Since then, under the auspices of our Board and of the eth Sanitary Association, Ernest L. Myer, of Elizabeth, has ted a similar map with full details. We can point with to these three maps, as furnishing a model for the whole and as showing what is needed to be done in every incor- d city, town or borough. By such maps all levels can be n, all underground constructions be recorded and such s, represented in a condensed or graphic way, as are essen- all future planning. For the want of just such records outlines we have seen a local institution waste no small nt of money, and can point to cities constantly making lers because of the absence of the necessary facts as to r work done, as to soil, gradients, etc.

addition to the mapping, inquiries were made as to all s relating to sanitary management and specimen sanitary ctions made. It had been expected that by this time the nal Board would have been able to publish the map and s, from which we could procure lithographs. It is still ed that work of such importance to the Nation, as well as State, will be provided for, so that the general government place within our reach the full results. Our Board has fore postponed the printing of the maps for this year, ugh they will be accessible to any cities wishing to study lans. We publish, however, some of the details of inspec- n this report, such as will give some idea of the work done f its importance as a model.

We are also able to present in connection herewith a brief and able report on the Question of Quarantine and exterior Sanitary Defences of the New Jersey front of the Harbor of New York, kindly prepared by Dr. Elisha Harris, Secretary of the New York State Board of Health.

It is plain that there are some interests along our State front opposite to New York City, which local care is not able to reach, and that the State in defense of its public health needs somehow to secure, better sanitary arrangements than at present exist. The crippled state of local resources delays action which ought to be taken for the protection of the people from some most flagrant and apparent sources of disease.

CONDITION OF ALMS-HOUSES—JAILS.

The State Sanitary Commission of 1866, as appointed by the law of the previous Legislature, reported as to the condition of the county and township alms-houses of the State. Some facts were then elicited which showed that their sanitary condition was too often overlooked. Some statements made as to the condition of county jails seemed to the Board to make it important to associate these in an inquiry. The Board was not able to undertake an investigation throughout the State, but thought it best to single out four or five counties as a fair indication of what might be needed in others. This work has been carefully and accurately performed and the results will appear in the paper on the subject which is a part of the report. No one can examine into the general facts as to the neglects which are apt to occur in all public institutions, where the dependent or the criminal classes are kept, without seeing that each State or each county has some provisions by which such places shall be subject to a careful examination as to their sanitary condition and the means of promoting the best interests of society, as related to the inmates. In many States this is regarded as so important as to be committed to a Board of Charities. Our inquiry has only related to those matters which bear more directly on health conditions. It is evident that in this respect there is need of more careful circumspection. Either the State Board or Local Boards of Health should so acquaint themselves with the sanitary condition of these institutions as to secure them from being sources of evil either to the surrounding or to the inmates. Just

report is being printed, we have had occasion to make a ry investigation of the Camden County Alms-house, on nt of a malignant form of fever prevailing there. The s will appear in the next report; but the number of es and the idleness and overcrowding that occurs in the r months, is even to the casual observer, evidence that a r care of all our county and township alms-houses is d. The present deplorable condition of that institution, is what must occur whenever the spark alights to set ablaze tra-hazardous material which has been collected.

DRAINAGE.

dealing with great sanitary questions we are constantly g how essential are proper ground conditions to the tenance of health.

tural water-courses are impeded and no provision made at additional drainage which varied construction and tion demand. This is especially true in respect to cities. g the valuable papers of this report will be found one presents this subject with fullness of detail, and with evidence as to its bearings upon the life and health of opulation. We call special attention to the careful use of some of the English tables, and to the practical ods advised for executing such sanitary work.

WATER SUPPLY.

e oft-recurring and vital question of water supply is ying the attention of many portions of our State. Several r larger cities have no adequate water supply. Others, having sufficient quantity, have reasons for great mis- g as to quality. While in good seasons and for the present may be escape from very pronounced evils, a great risk is run. There are reductions of vital force and bowel bances from impure water, which shorten and destroy as lives as does an occasional epidemic. Most of our larger are on tide water, and so, near the emptying places of . It matters much whether a water-course is intercepted n part appropriated as a water supply away up near its

sources, or whether it is taken as near its exit, as Newark or Jersey City. In many of our towns reliance is still placed upon well water. This answers, in the smaller villages, before any one street becomes compact; but where houses crowd each other, and the various out-door and in-door contrivances and cesspools of cities are introduced, there is no defense for the well. Its good previous reputation cannot save it when it gets into such vile company. It was for a time thought that driven wells, or wells called artesian, which go down beyond the reach of soil contamination, would be our safety. But joints or fissures in much of the underlying rock may contaminate these. Worse than all, by reason of hardness or other saline constituents, the water is seldom fit for use. The many trials about Newark and Bellville and Orange have, for the most part, proved unsatisfactory, except as furnishing a supply for machinery use. Rain water, properly stored in cisterns, often answers well, and is not liable to some of the objections urged against the rain water of the British Isles. Dr. Fox, an able medical officer of health, in his work on the "Sanitary Examinations of Water, Air and Food," places last the "waters of streams and rivulets, the majority of which contain more or less filth, and in times of heavy rains, soil and mineral debris of every description." All these water questions are worthy of the closest expert study before expensive methods of supply are adopted; but they should not be left undecided so long as to peril the growth of our cities and the health of the inhabitants. We hope ere long more fully to draw attention to the water-sheds of our State, and to the indications for supply which relate to special localities.

OUR SEASIDE RESORTS.

These need our careful attention because of their rapid growth; because so many of our citizens spend a portion of their time as residents there, and because so many take it for granted that a sandy soil will purify all that enters it and the great sea quickly carry away all that flows into its waters.

It is, however, constantly to be borne in mind that pure sand is not a good filter. We know of a case in which, on our shore, a part of a barrel of brine was emptied more than fifty feet distant from a deep tube or driven well. About three weeks

terwards the water of the well was found to be salt, and so ntinued for several days. The circumstance was recalled, id there was good reason to believe that the salt had thus und its way into the deep water supply.

It is known that at many places cesspools are relied upon and und convenient because they so seldom fill. Their contents ass rapidly into the soil and may easily pollute it or render it nfit for a water supply. In these rapidly growing towns and illages it should be an axiom that cesspools, if used at all, hould be made so tight that their contents will not leak into he ground, and should be emptied on a system. Since the ntroduction of iron piers, it may be quite feasible to have ewage boats so built that they shall receive this sewage by neans of pipes and as often as necessary, carry it out from shore, eyond the possibility of deposit on the shore sand. To illustrate he crudeness of present methods of sea-side disposal, and the ecessity of a more defensible system, we need only quote from he recent work of Robinson, an English Authority on Sewage)isposal:

"To avoid a nuisance the sewage must be discharged into the ea at a point, not only below low water, but where there is a ell ascertained current which would carry it permanently eaward.

A point of discharge complying with these conditions cannot lways be found to exist close to the town, or requires to be scertained by careful tidal and other observations. At the out- ll there should be a continuous movement seaward during the wenty-four hours, instead of an oscillating action to and fro, esulting in a return of the sewage and its disposition along the hore, not only at the outfall and in its immediate neighborhood, ut also at distant places to which the tide carries. The fore- hore of many watering places is being polluted in this way, and n time it will prejudicially affect them, as the knowledge that he foreshore is polluted becomes generally known.

The expenditure necessary to ensure an efficient system of sewage disposal, although it may appear heavy at first, is in the end, the truest economy.

The difficulties attending the discharge of sewage into the sea would be diminished were it not that it has a higher tempera-

ture, and a lower specific gravity than sea or river water, which causes it to rise to the surface. If it is not carried seaward quickly, part of the suspended solid impurities are deposited on the coast wherever there is still water and no tidal current, whilst the rest of the suspended, together with the dissolved impurities float on the surface, and are carried backwards and forwards by every tide, decomposing and liberating offensive gases."

This action was pointed out by Professor Stanley Jevons, in a letter to the *Times*, of December 2d, 1878, with reference to the formation of sewage mud banks in the Thames, by the discharge of sewage at the outfalls at Crossness and Barking.

He pointed out that matters which would remain suspended for many days in fresh water, would be readily precipitated in a few hours when the water is saline, and states that much of the sewage matter indeed, would, if left to itself, float in water; but in the presence of saline matter, which kills the pedetic or oscillating motion of suspended particles, cohesive attraction comes into play. The minute particles of suspended clay will then adhere to the organic sewage particles, and carry them to the bottom of the river, where they will form foul pestiferous banks of ooze.

In the same way we may explain the peculiarly unhealthy effect produced at seaside watering places, where the sewage is poured down the beach, into the sea, in front of the town, if any such there still be. Unless there be strong tidal currents the foul particles are not carried away, but are precipitated and mingled with the sand and mud of the beach.

If the salt water enters the sewers the deposit will occur therein, and we may infer that flushing the sewers with sea water, will probably do a good deal more harm than good.

In the proceedings of the Boston Society of Natural History, for February, 1874, Dr. Hunt, states: I have called attention to the fact that the clay resulting from the decay of rock remains for many days suspended in pure water, though not in waters even slightly saline, and is therefore readily precipitated in a few hours, when the turbid fresh waters mingle with those of the sea, thus forming fine argillaceous sediments.

The geological significance of this fact was, it is believed, first

ointed out in 1861, by Mr. Lidell, in Humphrey's and Abbot's Report on the Physics and Hydraulics of the Mississippi tiver," (appendix A, p. xi,) where he applied it to explain the ccumulations of mud at this river's mouth.

Sea water delays the oxidation of organic matters, so that the oul constituents of sewage, which in river water would be iberated and got rid of in a short time, are preserved in sea vater, which causes them to accumulate and form dangerous leposits ready for the quickening action of the summer sun, vhen gases, injurious to health, are evolved. It is claimed, too, hat brackish water, or foul material slightly saltish, attacks the efuse matters, and liberates foul-smelling gases.

The objectionable nature of deposits from sewage is evidenced by the observations made by the late Dr. Letheby, on the mud banks that are forming in the river Thames. He describes them as being composed of black and fetid mud, in a state of active putrefactive decomposition, and when examined under the microscope, they were found to consist of broken-up sewage matter, the remains of animalcules, the disintegrated tissues of vegetables, and swarms of diatomaceous remains; and he stated that the mud and suspended matters of the river contained from 6.3 to 18.9 per cent. of the solid constituents of sewage.

To prevent the possibility of doubt the connection between the deposits in the river, and the sewage discharge from the outfalls, has been clearly traced by analyses, and the chemical correspondence between the two unmistakably established.

The same opinion is held by Dr. Frankland and Dr. Tidy as to the similarity in chemical composition between the mud banks in the Thames and the sewage of the outfalls. In some cases, by means of long outfall sewers, the sewage is carried away from the place producing it to the sea, but they are frequently simply transferring the refuse to others, a set of the tide carrying it so as to cause mischief and nuisance elsewhere.

These outfall sewers require careful ventilation as the sewer gases are otherwise liable to be forced back into the town drains at high tide, or after storms, and thus into the houses, even if the house drains are trapped from the main sewers.

A catchment pit should be placed at the outfall, and the solids deposited therein removed systematically. Even then the addi-

tion of a disinfectant and deodorant is sometimes desirable, or it may be found feasible in connection with our iron piers to have a sewage boat so constructed as daily to receive the sewage and convey it three or four miles out to sea.

It will be pleasant when our own seaside resorts attain the precision in health management now secured by most of the English watering places. It is now considered indispensible that these should be able to certify themselves to the public, as to their water supply and methods of sewage disposal, and as to the actual records of health, both of residents and non-residents for series of years. Douglas Galton, in his anniversary address before the Sanitary Institute of Great Britain, says: "A comparison of the local acts obtained by different towns, shows the progress which is continually taking place in the sanitary intelligence of the community. This is illustrated by taking only one point, viz: the registrars of disease in several towns, notably, watering places or health resorts in which self-interest is largely concerned, have obtained power in special acts of Parliament to require the compulsory registration of infectious diseases. These towns, instead of concealing real nuisances or causes of disease, found that it is better, by publicity, to subject themselves to the highest tests of salubrity, and at the same time avail themselves of the highest motives for sanitary completeness.

RESCUE OF THE DROWNING.

The fact that our vital statistics of the last year showed the loss of one hundred and ninety-three persons by drowning, and that we have so long an extent of sea-coast, led us to print in the report of last year an article on drowning. Afterward the whole subject of the rescue from asphyxia was re-studied, and a full examination made of all the plans adopted for the resuscitation of the drowned. The result was the circular issued by this Board and largely distributed throughout the State. A captain in the life-saving service on our coast made himself conversant with it, and soon had an opportunity to apply it, as thus stated: "In a case of drowning at Monmouth Beach, not long since, after various efforts had been used to resuscitate the body by those present, Captain C. H. Valentine, Superintendent of

Life Saving Station No. 4, was sent for, and restored the man by following the rules for resuscitating the drowned, as laid down by the State Board of Health, and known as the New Jersey Method. These regulations have been adopted throughout the State, and are the most serviceable of any of the methods for resuscitating the drowned." It contains two or three directions not to be found in any other plan, and insists upon the value of the electric battery and the hypodermic syringe for administering brandy and digitalis. We commend it to the careful study of all who may be called on to treat such cases. We believe all life stations and all prominent hotels should have ready at hand the pocket battery and the hypodermic syringe. The whole cost is not over ten dollars, and, in some cases, these are indispensable. No one could read the facts as to the recent loss of General Torbet without feeling that any such resuscitation at hand would have saved his life. We commend this whole subject to the attention of our citizens, not only because of the number of accidents the last summer, but because, with our rivers and lakes and great seaside resorts, there is likely to be frequent need of this kind of service. Medical aid is in vain in such cases unless there is a full knowledge of the best methods of manipulation, and a ready resort to these collateral aids when required. We believe that this circular should be in each hotel on our coast, and that local health boards should extend a knowledge of it.

REGULATION OF MEDICAL PRACTICE.

In the early history of our country, and especially in our own State, important safeguards existed in order to assure the people that those who attempted the practice either of medicine, surgery or midwifery, had received such special preparation for their work, as to assure the people that the interests of human life would be promoted by their art.

By degrees, legislative restrictions gave way to an almost unprotected laxity. Illinois was the first State to move in the direction of restoring restrictive legislation. This did not seek to discriminate in favor of any one school or sect, but only required that all who professed to exercise the healing art should be able to give such evidence of previous preparation for their

duties, as might not unduly risk the health and the life of the citizen. The law went into effect July, 1877. It was found that out of the 7,600 physicians in the State, only 3,600 were legalized practitioners. In 1880 the number of authorized practitioners had increased to 4,825, and the number of unqualified practitioners had greatly decreased. Last year an additional evil was discovered, in the sale of diplomas, and became so flagrant as to attract the attention of our National Government. Subsequent revelations leave no doubt that in addition to the multitudes of unqualified practitioners who could show no license, several thousands more have operated under bogus diplomas and still further jeopardized human life. The disposition to limitation and restriction in our State, was manifest among the people and in some of our intelligent legislators before it was among authorized medical practitioners. The latter had become so used to this kind of laxity and so displeased with successive acts of legislation which had practically deprived them of any control of the matter, that they apparently viewed it with little concern. But it became so evident that the public health was suffering from this promiscuous practice, that the last Legislature enacted a mild form of restricting law. It only seeks to assure that each person claiming to be a doctor of medicine, should have received a license from some duly authorized Medical College. The State having done this much to protect the public health, and having shown this appreciation of the relation of proper medical education to the welfare of the citizen, it behooves all regularly educated practitioners to do their part in aiding to secure the fulfillment of the law. We think that the responsibility of a carrying out and enforcement of the law, commends itself to all local medical societies of all sects. No man whose diploma will not bear scrutiny need now be allowed to practice upon the credulity of the citizens. By a record of places of graduation, the people are better able to discriminate between those colleges of any sect which are best and those which have too low a grade of requirement. This Board has felt called upon to recognize this as one of the points in which the public has been guarded against what had become a prevailing nuisance. We append to this report a copy of the circular issued in reference to it and

ısive of the law. We counsel both the people and all local ical societies to see to it that its requirements are complied . We hope to have ere long a completed list of all those se names are recorded as practitioners, as we have now of all ɜ who claim to be practitioners, in each locality and so shall ble to compare the two. The duties of this Board are now ıumerous that we can scarcely do more than register the es. It must be left mostly to the people of each vicinity to authorized medical practitioners to see that purchased omas and empirics are abated. The law much needs a se by which the genuineness of copies of diplomas offered ecord can be known.

THE SANITARY EXHIBIT.

he value of an exhibition of sanitary appliances, as a means cquainting the people with the principles of their applica- and with various improvements conservative of the public th has long been recognized in Great Britain. Under the ices of the New Jersey State Fair, and with the aid of this d, the first American exhibit was held last year at Waverly. year the Agricultural Society erected a special building for anitary department. Although the display was not exten- we think no one examined it without feeling fully repaid, without realizing its importance. Systems of heating and ilation, the disposal of sewage, the various forms of house- contrivances and other sanitary subjects were illustrated. nvite to it the attention of all citizens, and hope as a Board in with others in promoting so great an interest. It will be plan to have on hand for exhibit some of the latest improve- ts from the sanitary museum we are seeking to establish at ton, and also each year to secure from dealers and inventors most approved appliances.

METEOROLOGY AND CLIMATOLOGY.

Meteorology properly embraces the study of atmospheric phe- ena resulting in connection with the physical properties conformation of the earth, in what we call climate and her." We, therefore, in its bearing on public health, study

meteorology only in its bearing in climatology. It is important to make precise records of atmospheric and atomic conditions as expressed in air, earth and water, in darkness and sunshine, in rain and snow, in frost and ice, in wind and moisture.

Having in these the elements from which weather is formed, we have the important factors which make up the climatic conditions, and so constitute the *climate*. Alongside of this, day by day, and month by month, we put the records of disease, of epidemics, of death.

It is evident that this is a department of health-study very discouraging to those who would arrive at quick conclusions. The long work of science is to collect every fact and through a sufficient number of years, so as to make the study feasible. It is encouraging that such results have been secured as enable us to predict many weather changes. Yet we still feel "that the time for the deductive treatment of weather problems has not yet arrived." The relations of weather and disease are still more complex and introduce a study as difficult as it is important. Outlines are already studied with advantage, but close deduction is still much in the future. Our Board at present only seeks to put accurately on record the chief facts as to weather conditions, in order that these comparisons may be made whenever sufficient facts are secured.

We, this year, are favored with the record of Hon. Wm. Whitehead since 1838, and thus supplement the record made by him to the time of the publication of the Geology of New Jersey in 1868. We are also perfecting records at Princeton, Newton and Vineland. New York and Philadelphia will represent other points in our State, and the records of the Signal Service are also of value. We hope thus to put on record several facts as to the weather, which will furnish the data for comparisons with prevalent diseases. The climate of the State is well worthy of the closest study in its bearing on health and disease. It has far more than usual varieties. Within our own borders, we believe, will yet be found nooks and districts which will show a record equal to the purity of the Adirondacks, and to the equability of Aiken. It may yet be that the consumptive will, on the basis of weather records, be able to stop short of Florida, and the seeker of a summer resort, not only on our ocean front, but amid our pines or high up in the northern hills, be able to shew both

records of instruments of physicians and by the experience
nvalids, a climate as desirable as any to be found in the
es. Some special weather conditions of the year are noted
where.

; is constantly apparent that diseases are greatly affected by
t we term the climate and the weather. "They are con-
ied, says Russell, in seasonal variations, in the prevalence
lisease; in regional variations of disease; in the circum-
ces which at one time and in one place give wings, so
peak, to the contagion, and at other places and at other
s obstruct their progress. We must recognize these
; if we wish to avoid the risk of falling into erroneous
rtion of success for preventive measures, and also to justify
mes what might seem undue confidence or undue anxiety
o the probable course of some disease where contagia
ominated in its activities by those cosmical conditions."
* The seasons bring their special tendencies to disease.
perature, and rain fall and hydrometric and electric phe-
ena are attended by proclivities to some diseases, while they
hostile to others. Were these the only controlling agencies,
e can not control the weather, we would only study how to
ify its effects or protect ourselves therefrom. But as these
atic conditions only act upon materials already in existence
r as contagions are concerned, we seek to suspend or diminish
e even though we can not operate with good success upon
gs celestial. Our inability to control these climatic con-
ns is no more a reason for neglecting to study the source and
es of contagion, than it would be for the farmer to neglect
he details of preparing ground and sowing and caring for
seed because he could not know all about the weather and
coming season.

DISEASES OF ANIMALS.

n inquiry into the diseases of animals has always been a
of the duties of this Board. It has close relations to the
ic health, because of the flesh and milk consumed, because
diseases of animals are communicated to or affect man-
, and because through their comparative study we get light
the nature, causes and prevention of some human diseases.
r an act of the last Legislature the care of the contagious

diseases of animals was committed to this Board, with spec reference to contagious pleuro-pneumonia which had existed previous year in the State. The fact that at the close of service of a temporary bureau of the previous year, 110 he of cattle were in quarantine, made it necessary promptly examine into the disease as it had existed or did still exist these herds. A full inquiry and investigation showed that disease that had existed in these herds had nearly ceased.

Active measures were at once taken by this Board to keep prised of any new outbreaks in these localities or elsewhere, circulars largely distributed to aid both in the identification prompt report of cases. It has been a year of heavy los cattle by reason of fire, drought and sickness, and so, many c came under our inspection for examination which were fo suffering from other causes. The chief localities of the dis have been in one township of Union and Camden county, in some of the townships about Mt. Holly, in Burlington cou

The disease has needed very careful guarding, and in sev herds in the latter county has been difficult to control. 8 animals died in each of these counties, and many more slaughtered. It has been a large burden and anxiety to Board, but the results have been fully as satisfactory as could have expected. We have been greatly aided by the P sylvania authorities. The disease still needs watchful The full minutes as to it, will be found, as required by la the Report of the State Board of Agriculture.

The collateral interests of the disease are such in respe public health, that an article on Pleuro-Pneumonia is embo in this Report, together with some circulars relating the The whole subject is worthy of the careful attention of all o citizens, for the terms of the disease have not been magn With the single exception of a difference of opinion as t construction of a clause of the law, which was amicably se by reference to the Attorney-General, the co-operation give by the farmers has been complete, and we owe much to appreciation and aid. William E. Miller, D. V. S., of Car J. K. Dyer, D. V. S., of Mt. Holly, and J. A. McLaughlin, D. of Jersey City, have faithfully served the Board as Inspe and we are indebted to other veterinarians for information assistance.

v cases of glanders have occurred in the State. Of these, rere disposed of without compensation by the consent of ıer. In two instances payment was made by the Board.
o-Enteretis, or hog *cholera*, as it is popularly, but erro- called, has prevailed in a portion of Warren county. gh a contagious and destructive disease, about which the need information, it does not at present threaten to

The excellent treatise of the National Government as to ɔeen furnished by us in all infected localities.
-cholera, splenic fever, anthrax and tuberculosis, and the other comparative studies, both with reference to dis- nd pathological changes in flesh and secretions resulting isease, can not be overlooked by those who are concerned n the art of preventing or healing disease. The recent able investigations of Pasteur, Touissant, Koch, Green- ıd Fleming, as to the causes of fowl cholera which is not ra, but a virulent blood poison, attended with swelling of vical glands and dnodenal inflammation, has recently iscovered by Pasteur to be capable of prevention by a ıe" method, and the discovery may lead to similar l, through a large range of animal diseases.
ɔpizootic, similar to that which occurred in 1872–3, has ed among horses during the fall of 1880. It had a simi- ɔction of movement, and similar symptoms, but was not ıd with so large a mortality. The climatic conditions ıore favorable than during the former epidemic. There is ɔe to show that at the same time a similar influenza pre- among men. In some cases it almost seemed to have ommunicated from horses.

MILK SUPPLY.

ill referring to the sale and adulteration of milk, was nformally placed under the oversight of Board. A com- inspector was placed in charge of its execution. He has ll that the bill would permit, and has accomplished some- in guarding the public health. It is essential that some ions be made in it if it is to be effective for the purposes ɔd. The law and circulars as issued are appended to the

The article of Dr. William K. Newton, the inspector, on upply contains important information, and may help to us to future legislation.

PAPERS, SCHEDULES AND MAPS

RELATING TO SURVEY OF PARTS OF HUDSON COUNTY.

EPORT OF SANITARY SURVEY AND INSPECTION OF PARTS OF HUDSON COUNTY, AS DIRECTED BY THE NATIONAL BOARD OF HEALTH, UNDER THE SUPERVISION OF THE NEW JERSEY STATE BOARD OF HEALTH.

BY MESSRS. SPIELMANN & BRUSH, HOBOKEN, N. J.

ENTLEMEN:—In the discharge of the duties assigned us, we the honor to make to you the following report as embodying estions with reference to such questions contained under dules "F," "H," "K," "L" and "M," as seemed to us most ortant and as needing your attention to be directed to 1. We will confine ourselves, in our remarks, to the ques- s as far as they concern Hoboken, West Hoboken, Weehauken, 1 of Union and township of Union, the remainder of the ection having been apportioned to the other gentlemen posing the committee. We have already in our answers, in ıy instances, embodied suggestions which, in themselves, ually form the basis of a report. But in order to call more ial attention to the most important items, we will take them in regular order, and point out what, to us, has seemed the t important particulars in which the sanitary condition of se places might be improved.

n carefully reading over the questions and answers to them ler schedule "F," we find our attention directed to question "Are the cellars and basements in any part of the city np or insufficiently drained? If so specify." Under schedule ," question 17: "What proportion of the area of the city is

not sewered?" We find that about one-half of Hoboken, or about nearly three hundred and sixty acres, is not sewered at all. Besides the fact of not being sewered, it must be borne in mind that this portion is low and mostly meadow or swamp land, about two feet below high tide, and in fact is As a natural consequence, it is constantly saturated and covered in many places with water, which, being mostly stagnant and poisoned by the constant addition of sewage matter from privies, refuse and garbage from grocery houses and animal secretions, becomes very foul, and pollutes the surrounding atmosphere in the entire neighborhood, thus rendering it unfit in many cases to be breathed.

The extent of the prevalence of these gases during the warm season may be realized when we consider the fact that the paint used on the outside of dwellings, in the worst neighborhood, has become decomposed and rendered of that bluish tinge which is a the interior of outhouses frequently assumes. Consequently, not only are the cellars and basements in this portion of Hoboken insufficiently drained, but practically, they are not drained at all, thus leaving the cellars always moist and most of the time partially or entirely filled with water.

The detriment to health from such a lack of drainage must be apparent to all, and by reference to a report on the death rate from zymotic diseases in this part of Hoboken, read by our firm at the last annual meeting at Trenton, it will appear to have been fully twice as great during the year 1875 as in the more elevated portions of the city where proper drainage has been provided, and more attention is paid to the laws of health.

We might add a great deal to what we have already said; in fact, it is a subject upon which a great deal of interest has been concentrated lately; but will conclude with the suggestion:

That the only remedy for this grievous evil is a thorough and complete system for the drainage of the low lands by dykes, dams, sewers and pumps and such other provision as will provide for the thorough pumping out of the sewage and rain water at all times and under all circumstances. The above subject is one which has been investigated by competent engineers in this locality, and upon which plans, accompanied by full and exhaustive reports, have been prepared and submitted to the public authorities. The question remaining unsolved in the main is the one: How shall it be brought about and who shall pay for it? This we will not discuss but will leave to the persons

ectly interested. We will now turn to Schedule "H," and der it to question 21—30. "In regard to use of cesspools, ivy vaults and water closets and manner of constructing them d keeping them clean?" In the city of Hoboken, where sewers ist, the water closets in use in all other cities having drainage d water supply, are employed. These, although of the most proved pattern, always become objectionable when within a ilding, unless they are perfectly ventilated. This it is not ways an easy matter to do, and provision is only seldom made r it; consequently when they are located in the interior of a ilding, without communicating with the outer air directly by window, and are not ventilated by a special flue or pipe communicating with the exterior, they often become very objectionble and may give rise to disease by poisonous gases. The outouses and privy vaults, although emptied once in several onths, yet as they are located in a closely built back yard, rrounded by high walls, are not so likely to make the air in e interior of a building impure and poisonous as an illy entilated water closet.

We would therefore conclude that the most desirable location r a water closet is entirely without a building, especially when e can have it connected with a good sewer, thus providing for s always being clean and free from the accumulation of objeconable matter. If this cannot be secured, a proper system of entilation should be provided in every instance in which water osets are located in the interior of buildings, and especially ould this be compulsory in all schools, halls, and large public ildings, for which purpose compulsory laws should be passed. uestions 7, 8, 9, under Schedule "K," "As to slaughter houses d abattoirs" have especial interest since the large abattoir and ock yards are here and constitute the chief cattle market for a rge population.

It is often the case that animals are loaded, or rather packed close cars, so that they cannot lie down, and are required to and without either food or water for four or five days, and are en unloaded at a place of slaughter, and killed in an hour terwards, and while laboring under an intense degree of excitement. If the consumers of beef could witness the long trains cars loaded with cattle while being brought from the west and quired to stand on sidings, often a whole day at a time, and

hear the lowing and moaning of the poor suffering brutes for the luxuries, to them, of food and water, such a hue and cry would go up as would soon create some legislative action upon the subject. So long as that state of affairs is allowed to exist just so long must we expect to have meat wholly unfit for human consumption, go upon the market.

All diseases that are accompanied by acute febrile symptoms in the first stages, as well as those that are characterized by purulent collections which are afterwards absorbed into the circulatory system, will render the flesh unfit for human consumption, to wit: An animal being required to stand in an open car for a long time without food or drink, becomes in consequence debilitated, which renders it susceptible to contract colds, which is a common term for catarrh, whether gastric, nasal, intestinal or any other form, inflammation supervenes which often assumes a gangrenous nature; strumous diseases follow, and in consequence the system will soon become loaded with effete materials which permeate the flesh.

This condition may be present either in the first or acute or in the second or chronic stage."

Under manufactories and trades, (schedule "L,") we only need to say that there are very few manufactories in the section included in our territory, and that we took pains to visit them and inspect them carefully, with very gratifying results.

We found them in every case well provided with means for lighting and ventilating them, and the appearance of the operatives was in general very gratifying.

By reference to the answers under schedule "L," it will appear that no children of tender years are employed, but that the ages of the youngest are not generally below 13, and that the regulations governing their hours of work are reasonable. We only hope that other districts will show as favorable a result.

We now turn to the closing schedule "M," perhaps the most important. Much can be said upon the merits of the different items under the schedule, and still the fund of information could hardly be exhausted. We cannot refrain from acknowledging the uniform courtesy extended to us by all the principals visited and the spirit of interest manifested by them to cooperate with us.

By reference to question "3," under schedule "M," the plans of

ıools will show that the rooms are generally of good size
ell arranged. Much trouble is experienced in securing
: ventilation. Our impression on visiting the different
s generally, was that the air was thick and impure because
ıtion in most of them could be secured only by opening
ndows. The teachers themselves do not seem to realize
ct as visitors coming from out doors do, because constant
ɔntinuous confinement indoors renders them less suscep-
ɔ notice the impurity, than those who have the advantage
ng in the open air much. We spoke of this to many of
and found they concurred with us in our views and
ted the difficulty.

a remedy we would suggest that every room in a school-
should have a separate ventilating flue, communicating
he outer air in order that the ventilation should become
ratively self-adjusting. The lack in this respect may
ounted for in consequence of the date of construction of
of them, which was at a time when the subject of ventila-
ras not so well understood, and had not attracted the
on of the public in the same degree that it now does.

cannot close without referring to the unsatisfactory answers
ed to the questions and notes under No. 44 of this schedule.
withstanding the fact that we visited many of the oldest
ioners and tried to get their views on the subject matter
this question, we found that they had not had occasion to
ne into it previously, and were thus unwilling to express
ɔinion entering into details on the subject matter.

sicians ought to be entrusted with this very important
n in order that when another inspection may be ordered
National Board they may be prepared to meet it.

ivate corporations find it sufficiently important to warrant
in examining their servants, who are entrusted with the
life, in regard to color blindness, then how much more
ant should it be for the National Government to secure
r and even more comprehensive information with refer-
ɔ the public from the institutions of learning, by means
mination conducted by the medical profession.

close our report with the above suggestions and hope that
ontents will awaken a still greater interest in the subject
itary engineering, *especially* for the important section
consideration.

REPORT OF SANITARY SURVEY AND INSPECTION OF PARTS OF HUDSON COUNTY, NEW JERSEY, AS DIRECTED BY THE NATIONAL BOARD OF HEALTH, UNDER SUPERVISION OF THE NEW JERSEY STATE BOARD OF HEALTH.

REPORT OF MESSRS. BRUSH & EDDY, OF BAYONNE, N. J.

GENTLEMEN:—In the discharge of the duties assigned us, we have the honor to make to you the following report of the sanitary survey and inspection of the city of Bayonne, New Jersey.

The city comprises the territory formerly known as that part of old Bergen township south of Morris canal. It is surrounded by water, and is bounded on the north by the Morris canal, on the east by New York Bay, on the south by the Kill von Kull, and on the west by Newark Bay; including an area of 2,500 acres; of which about 500 is salt meadow, and about 100 closely built upon. Its topography is quite similar to the neighboring metropolis—Manhattan Island.

The city was founded in 1861, and incorporated in 1869. The population in 1870 was 3,835, and the estimated population at the present time (April, 1880,) is 8,000, of these about 700 are under 5 years of age.

The site of the city is nearly level, and the original conformation has not been materially changed.

The highest elevation above sea level is 67 feet, the lowest 1 foot, and the average level of the city is 30 feet. The direction of the general surface slope of the city is southeast.

The character of the surface soil is sandy and loamy, with occasional croppings of trap rock. About 10 acres on Kill von Kull, and about 10 acres on New York Bay, is known as made *land.* This "made land" is not as yet built upon, but is intended *for docks* and warehouses.

WATER SUPPLY.—The water supply is by means of wells and sterns.

STREETS.—The usual width of the street is sixty feet, with a dewalk one-fifth the width of the street. The sidewalks are aved with bluestone 4 feet wide. Forty-three miles of streets re unpaved, only one mile is paved, and that with Macadam avement.

HABITATIONS.—The dwelling houses now in the city limits umber about twelve hundred; these are mostly wooden build-ıgs, two or three stories high, and nearly all, with the exception f those located in the Fourth Ward, and at Constable Hook, and few rows of brick and wooden buildings in the Second Ward, re detached or isolated, with sufficient clear space all around hem; about one-third are inhabited by the owners, and the ıverage occupancy of each dwelling throughout the city is seven. There are about three hundred tenement houses in the city; hese are located in the Fourth Ward and at Constable Hook. The tenements, at present, if we except those at Constable Hook, are not overcrowded; but as the tendency is to erect buildings of this description in certain sections of the city, especially in the neighborhood of manufactories, (which are increasing rapidly on our water fronts,) and knowing the evils which imperil health and life, in consequence of overcrowding and bad ventilation, we think it wise, in time, that municipal regulations be enacted for the proper construction of dwellings and the prevention of overcrowding.

By reference to the survey map, we see at present constructed four and one-half miles of sewers in the city. All the dwellings along this sewer line, and where practicable a short distance off the line, have sewer connections with tight drains and traps. Most of the houses off these sewer lines, except those located near the borders or water fronts, have the laundry and waste water drainage into the gutters, and the cellars in some localities are damp, by reason of insufficient drainage.

SEWERS.—The city has adopted a complete plan for sewerage, as shown on the topographical map, but as they have no power to enter private property, and as some of the streets through which the outlet sewers would pass are not open, they have resorted to the expedient of temporary outlets across the salt meadows; notably *at the foot of* Cottage street, where the sewer-

age of the most densely populated section is thrown into an open ditch, which has become reeking with filth, and a source of much trouble to the Health Board. We would recommend additional powers to local boards of health, to force the completion of sewers to their proper outlet.

GARBAGE AND EXCRETA:—No contract exists in the city for the removal of garbage, and the proper distribution of ashes, garbage and rubbish is becoming one of the most difficult and troublesome duties of the local Board of Health of this city. In those sections of the city adjoining farm lands and gardens, the garbage is used for compost. By some it is thrown over fences into vacant lots, to be consumed by fowls, or left to decompose. A portion of the swill and garbage is collected from house to house by persons engaged in feeding swine, but this is done in a very careless manner, with open wagons or wheelbarrows; the liquid portions leak from the rude vehicles as they pass along the streets or sidewalks, and often a considerable part is deposited on the walks or in the gutters. On the sidewalk before some of the tenement houses, the owners have placed large wooden boxes, into which is deposited all the ashes, garbage and filth accruing on the premises, but in consequence of the very irregular and imperfect manner in which they are emptied, they become worse than useless; they are allowed often to become full to overflowing, and left in this condition for days, exposed to the influence of sun and rain, their contents becoming fluid from putrefaction, leak through upon the sidewalks and into the gutters. These wooden structures are liable to become so saturated with the fluids escaping from their filthy contents, as to constitute, of themselves, a disgusting nuisance, detrimental to health. These facts suggest the necessity of adopting some temporary receptacle for garbage, constructed of a material that will not absorb fluids, and for a *regular* and *systematic* method of collecting and disposing of such house refuse; perhaps a box of proper shape and size, made of wood that has been thoroughly kyanized or saturated with carbolic acid, might be kept sufficiently disinfected to be harmless.

PRIVY VAULTS AND WELLS.—About three-fourths of the dwellings depend wholly on privy vaults, and a very few, if any, of these vaults are water tight, and no regulations exist, as to the *method of* construction or cleaning the same. The faulty con-

struction and bad management of these vaults will become one of the chief causes of disease in the crowded districts. Some of these vaults are in too close proximity to wells, and the waters are very liable to be contaminated by the infiltration, through the ground, of liquid material from the vaults into the wells. We would suggest the great importance of having all privy vaults water-tight, and, when possible, connected with the sewer. The vaults should be constructed in such a manner, by rear folding doors, sheds, &c., that they may be readily cleaned out. We would also suggest the importance, especially in the tenement portions of the district, of prohibiting the sinking of wells on the premises, and that at proper intervals or distances on the sidewalk wells be sunk, from which water may be drawn, for drinking and culinary purposes, by means of the "old tea water pump."

GAS.—The gas works, and the quality of gas furnished, are satisfactory on all points.

MARKETS AND SLAUGHTER HOUSES.—There are no public markets or slaughter houses in the city limits. The tradesmen, and many of the inhabitants, obtain their supply of meats and vegetables mostly from New York City.

MILK SUPPLY.—The quality of the milk supplied is very good.

PUBLIC SCHOOL BUILDINGS.—There are five (5) substantial brick public school buildings in the city. They are all detached, with plenty of ground and air space around, and will compare favorably, as regards location, construction, grade and course of studies, with any in the State. We append to the report the floor plan of each school, and copies of the Manual of the Board of Education.

MANUFACTORIES AND TRADES.—The manufacturing establishments in the city at present are mostly located at Constable Hook, on Kill von Kull, viz: Raynold's Color Works; Osgood & Co.'s Zinc and Acid Works; White's Sulphur Works; Standard Oil Company Refinery; Sea Board Refinery, and Kalbfleisch's Sons Chemical Works.

As the tendency is to an increase of manufactories of various kinds on the water fronts, proper restrictions should be imposed, to prevent the escape of noxious gases or vapors into the external air; for no business, *detrimental* to the public health, that posi-

tively neglects to adopt the well-known remedies that will perfectly remove all cause of complaint, should be tolerated in a civilized community.

FILLING IN OF WATER FRONTS.—As the filling of the shallow waters of the adjacent bays is becoming an enterprise of the immediate future, we would call attention to the practice of filling with New York City garbage. The area to be filled is extensive, and its value, when improved, offers great inducements to effect its improvement. The use of improper material in filling will undoubtedly cause disease when this area is occupied, and we would recommend that the Health Board be empowered to regulate the use of material.

Appended to this report may be found the answers to all the "schedule questions," as far as they pertain to this city, from "A" to "N," and a copy of the municipal regulations and ordinances relating thereto. Also, through the kindness of the Chief of Police, and the Chief of the Fire Department, we append the answers to schedules "O" and "P." We also furnish the answers to schedule "R" on public health laws and sanitary officials.

[SEE PLAN.]

We present a special map or diagram, showing two blocks or squares of tenements surrounded by privies, and the close proximity of these vaults to wells. These tenements are located at Constable Hook. They are two-story frame double houses, with halls from front to rear, and occupied by four families each, each family having one living room and two bed rooms, windows in each room. The contents of the privy vaults are liable to overflow in wet weather, garbage and house slops are thrown often from the doors on the open space in front, and the wells are becoming contaminated and unfit for use.

The diagram illustrates the evils that will arise if this manner of building is allowed in any section of the district.

QUARANTINE SANITARY DEFENSES.

E QUESTIONS OF QUARANTINE AND EXTERIOR SANITARY DEFENSES OF THE NEW JERSEY FRONT OF THE HARBOR OF NEW YORK.

---

r ELISHA HARRIS, M. D., SECRETARY OF NEW YORK STATE BOARD OF HEALTH,

o EZRA M. HUNT, M. D.,
Corresponding Sec. State Board of Health of N. J.

DOCTOR: In complying with your request in regard to a review the questions relating to the quarantine and external sanitary fenses of the New Jersey side of the harbor and bay of New ork, I am rendering a duty implied in the instructions I ceived from the National Board of Health, in August last.

As the harbor and port of New York touch the eastern boun- of New Jersey at the high-water line, for many miles, and he quarantine jurisdiction of this port is now recognized ughout the coast line of the four northern counties of your , at tide-water, namely, Bergen, Hudson, Essex and Union, o-ordinate interest of New Jersey in the sanitary protection ıe Port of New York, is too obvious to require discussion by

e may usefully consider these questions of co-ordinate inter- and the sanitation of the entire port; its shipping, its waters whatever defiles them; its shores and reclaimed grounds, and slands and its wharves, docks and basins, as being alike ortant to the commerce, business and general welfare of the ple of New Jersey and New York. We may estimate the t correctness of this view by the census of the shipping in any day in *the warm seasons, as* we frequently enumerated

the official shipping lists last summer and autumn. The annexed summary shows how the vessels which were accounted for on the 20th of September, 1879, as in the Port of New York, were actually distributed at that date, these numbers and their distribution being fair averages for the entire summer and autumn:

At the wharves and docks of New York	
" " " Brooklyn	
" " " Jersey City	
" " " Hoboken	
" " " Weehawken,	
In the stream at anchor	
" Long Island City	
" Amboy, for cargo or repairs	
" Staten Island	
" Elizabethport,	
" Quarantine	
Total	

At the same time a great number of small vessels, engaged in local traffic and not enumerated in this list, were lying at various places within the New York quarantine limits, between the line of the Palisades, on the north, and that of the Blazing Star at Woodbridge, on the south. The U. S. Customs Districts of Newark, and that of Perth Amboy, comprise a tidal front, with which our enumeration of vessels was not extended, but the summary on the preceeding paper is exclusively of vessels that were entered at the New York Custom House.

The one hundred or more vessels thus moored constantly at the Jersey side, while nominally at the port of New York, constitute more than a tenth part of all the vessels constantly in the port. Therefore the question, "is New Jersey concerned in all of the quarantine measures of this port and of the nation?" is to be answered affirmatively. The corollary of this question is necessarily, "*If so concerned*, how shall this extended or most populous region of New Jersey secure all the protection needed to maintain all the safeguards which her people and their commerce and vast investment and great thoroughfares require? Let us proceed to answer these questions by examining the facts concerned.

The sanitary interests of the entire tidal front of New Jersey

ndy Hook to the northern limit of Bergen county, sixty
early, are identical with those of the port and city of
ork, and with some fifty miles of the Long Island and
nester coast-lines, which complete the opposite outline of
t. The history of the quarantine system in this port,
nat in 1758, when the peninsula of Communipaw and
was a wilderness, the Colonial government of New York
ed Bedloe's Island as the northern limit of the quaran-
horage grounds. In 1794, the limits and the hospital
were changed to Governor's Island, to the great peril of
of New York, and in 1799, the establishment was
to Staten Island. In thus providing for her own pro-
the State of New York secured the necessary safeguards
Jersey side of the great harbor, as that shore was then,
il recently, occupied.
port of Perth Amboy had its own sufficient system of
defense, its quarantine law dating from 1799, and for
ears its health officers acting in harmony with those of
rantine office at Staten Island. Though Amboy was
enaced by a very limited infected district, and had, in
years, numerous arrivals of infected vessels at her quar-
nchorage, the statutes relating to port quarantines in
rsey remain very simple, and as regards the vast new
d rapidly-growing commerce of Jersey City, and the
dal front of Hudson county, the changed condition of
will not now admit of completely adequate sanitary
neasures, in the nature of quarantine defenses, unless
easures are co-ordinated with those of the quarantine
of the port of New York. Even when so co-ordinated,
ill must be such a sanitary treatment of the vast area of
unicipal front, at and near the tide-level, as shall prevent
becoming the very soil, and nidus of pestilential infec-

this in view, my general report to the National Board of
nas arrayed the reasons and various facts relating to this
which I would but refer to in this statement.
raphic descriptions and correct maps which the engi-
id surveyors in your inspecting corps have presented
y explain the nature and importance of the points to
refer in thus saying, without further explanations, that

the tidal front must henceforth be so treated as to be prevented from becoming the very soil and nidus of pestilent infection. That this can be done we know; and that your faithful expert assistants and you, sir, have correctly set forth and judiciously estimated the sanitary problems upon which such protection and future well being will depend, I fully believe. Millions of wealth and yearly gains, and the health and welfare of a great population which are crowding the longest tidal front of the port of New York, demand this forethought and plan for permanent improvements, and a carefully devised system of sanitary works and expert surveillance that shall extend along the entire eastern side of Hudson county, and eventually be imitated along the front of Essex, Union and Middlesex. It is to this unequalled shipping front that the largest products of the American continent will come, and there we shall see the greatest unbroken length of the world's shipping depots and accumulated products awaiting shipment. Even before a half century will have elapsed there will probably be more than a million of inhabitants in the five tidal front counties we have just enumerated. The sanitary problems are momentous to that population, and even more momentous to this nation, this metropolitan port and to the world's commerce.

We now inquire what are and what should be the exterior sanitary defences of the Jersey side of this port?

It is safe to assert that the exigencies of commerce and travel are such upon the Jersey side, as well as in New York, that no exclusive dependence on the port quarantine can give the necessary protection against liabilities to the carrying and occasional planting of certain kinds of disease poisons of germs. The West Indian commerce will menace our water sides occasionally, and other pestilent infections than that of yellow fever may come. The quarantine system of this port must be maintained most skillfully and faithfully, and yet the local sanitation and the methods of public health administration should be so adequate that any and all contagia and the causes of pestilent maladies shall be controlled, prevented, "stamped out." This is *practicable* therefore *it is duty.*

The port sanitation and the naval sanitation will, ere long, be, to a good and efficient degree, nationalized; but even when perfect in all respects we must not lean upon quarantine solely for

)lute protection that this vast port and, most decidedly, sey side of the harbor, will require. The mere rumor, eign tongue, that there is a yellow fever scare, or even a g fever alarm, in New York, Brooklyn or Jersey City, e or Hoboken, will, as the stupid world of ignorant peo-, secures the blind edict of a relentless quarantine, like ich Portugal enforced against the State of New Jersey r. Let the world be well assured that we are automati- cure and in an unbroken state of sanitary protection.

)F THE ESSENTIAL CONDITIONS OF ABSOLUTE PROTECTION FROM EXOTIC FEVERS.

Jersey side of our harbor has been remarkably *saved* llow fever, yet the entire area below the outcropping of)-rock, an extent comprising more than half of Hudson now the reclaimed grounds along the harbor are to be l, is naturally fitted to be invaded by yellow fever and xotic infections. Systematic drainage, extended parks)d administration of public health service, will render ire district one of the most salubrious. We have wit- most insignificant invasion of that little peninsula you ven's Point, (the most southern headland within the limits of Jersey City,) in September, 1856. A new state- attress had been washed ashore in front of the old man- en a family boarding house, half a mile from any other gs. It was a tempting prize, and so freshly cast upon the m an infected vessel, that it was not yet sodden through a water. Four days afterwards, the master of the house on that mattress, in an open hallway. He died of black few days later, and two or more members of his own nd six of his boarders took the fever. Two of the latter the black vomit, and four others recovered in the quar- ospital, under my supervision. Another field-laborer was d to the same hospital in a dying condition from yellow These cases are quoted from a vivid memory of the events to hat is possibly a future peril. Be forearmed, therefore, will protect one of the most promising and affluent cial districts of the world. Repeated personal inspec- the several miles of tidal fronts of Hudson county, from I received cases of yellow fever that were thus traced to

a bathing or boarding resort there, have enabled me to appreciate the facts to which this statement refers. The comprehensive schemes of commercial development of the entire harbor-front of Hudson county now compel attention, and invite some adequate preparation in regard to the sanitary problems that will inevitably be important to the port, as well as to the property and commercial welfare of the Hudson county front of it.

About 3,600 acres of salt marsh and tide-washed shoals are being reclaimed and will, in the course of a few years, be covered by the structures that commerce and a busy population will need to find well defended against all sources of pestilential disease. Unless so defended, those 3,600 acres and homes of a million of inhabitants of the four contiguous counties may be frequently in jeopardy. Not only may the exotic germs of yellow fever menace that extensive area of made-ground, but the sources of evil will become inherent in that ground if its very grading and substance are not protected from the errors which we already witness in various places that are now being filled and built upon, in the absence of competent and faithful engineering plans. On the other hand, we now witness good work at certain points along the ten miles of front where improvements are in progress. We would recapitulate from notes taken while on the grounds and waters here mentioned, the following points relating to the protection which *local sanitation* should add to all that any rational quarantine service of the port can render:

1.—The filling, grading and artificial drainage of the reclaimed ground require skillful engineering, to secure every portion of the low lands and water front from becoming sodden with filth and sewerage. Though saturated to the plane of high tide level, all these grounds should be so treated as to remain free from mephitic emanations and be as clean and dry at the surface as possible. To permit these grounds to remain undrained, as they would be if not drained by a system separate from the sewerage, or to permit them to be badly sewered, or the sewerage to be debouched along the docked and bulkheaded front, would create an inviting nidus or prolific ground for propagating dangerous disease.

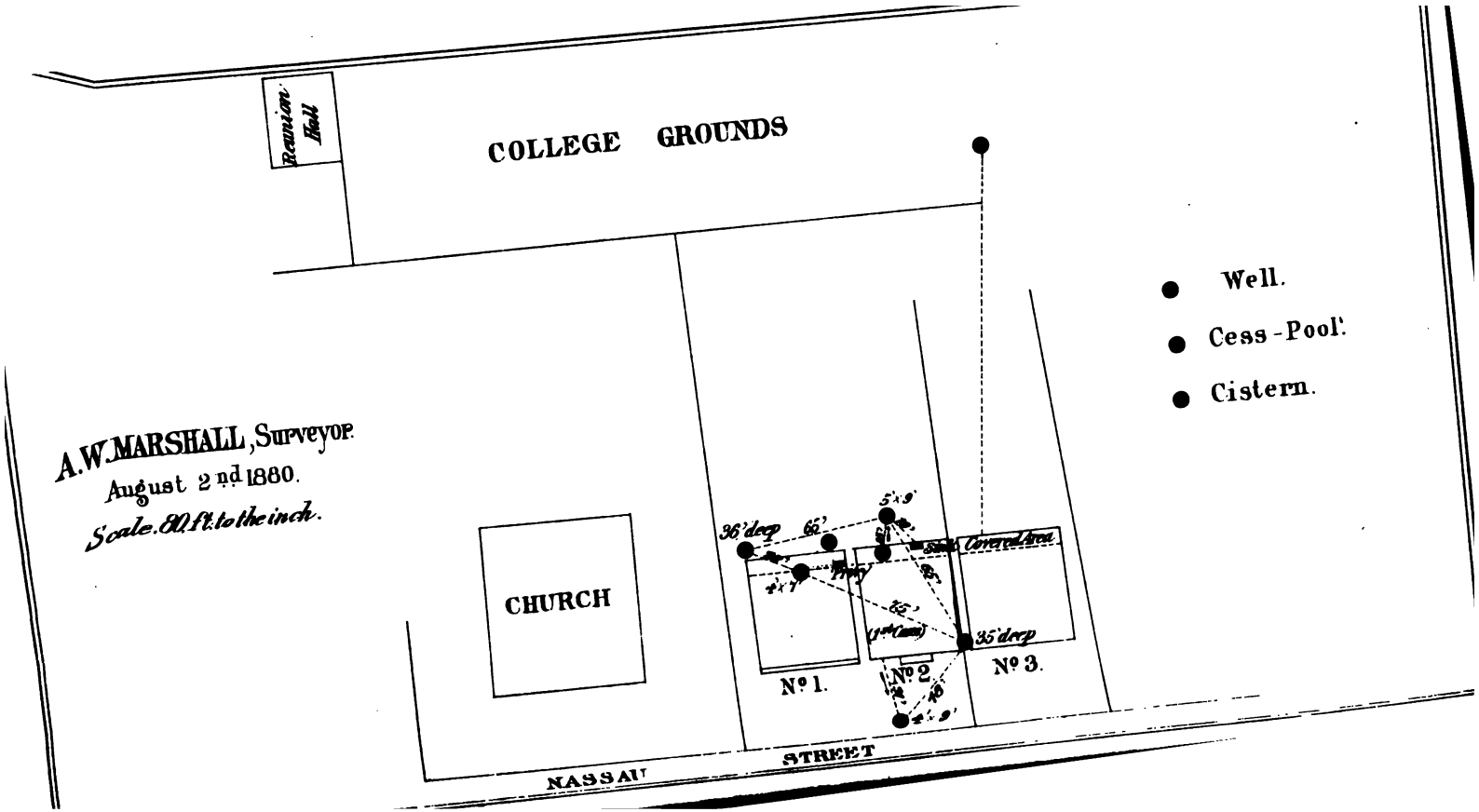
2.—All wooden crib structures along the tidal front or the streams, whether to facilitate the filling and bulkheading, or to

as the bases of docks and wharves or buildings, will prove
snares and unsanitary conditions when too late to be pre-
ed.

—The Hudson county sanitary authorities, or the State Board
lealth, will need refuge or exterior sanitary station, within
access from any portion of the region of New Jersey, com-
d within the U. S. customs districts of New York, Newark
Perth Amboy. This, as a matter of prevision and specific
and method, is all we here can mention. The facts stated
ou, sir, in the Third Annual Report of the State Board of
th, concerning a temporary arrangement with the quaran-
uthorities of New York, convey a correct idea of both objects
neans in regard to such an exterior safeguard. That which
xtemporised last autumn as a substitute for an independent
ary refuge or quarantine lazaretto and boat for the immedi-
gregation and removal of *infected persons and material*, may
ndered so permanently a ready method that New Jersey shall
lack a perfect preparation for this exterior sanitary police
e. The peculiar advantage of such an arrangement for
ring the benefits and all facilities of the New York quaran-
islets, lazaretto and transport steamboat is that of entire
s, certainty and promptitude of the sanitary duty
especially if Hudson county will maintain a convenient
landing at its old alms-hospital front. These facilities
l give some very desirable kinds of protection to the Jersey
of this port, and would prevent needless and harmful
us and exposures as regards the portable pestilences to
the shipping and the railway depots may at times be
ct.

—In conclusion we notice that the method and almost un-
ed limitations of the *riparian* titles and properties, as at
nt acquired by individuals and corporations, under the
Jersey statutes, do not seem to recognize the obligations
may become due to the sanitary authorities. This is not
nentioned as a criticism, but simply as a fact which readily
be remedied without any impairment or invasion of the
an rights. To protect by the safeguards of law and of
l surveillance all and any of the extended harbor front of
commercial districts, is tantamount to a protection and in-
ce, and even an enhancement of the cash values of every

portion, while by this means all burdens of quarantine an
nuisance litigations may be prevented. But it is less the pre
than the future interests we here allude to; and we must cons
that as the State is now rapidly selling these riparian prope
as mere property, without reference to the sanitary questions w
will be important in a near future, the present is the proper
for this suggestion.


Examination Hall
COLLEGE GROUNDS
Well.
Cess-Pool.
Cistern.
A.W. MARSHALL, Surveyor.
August 2nd 1880.
Scale. 80 ft. to the inch.
CHURCH
36' deep
65'
5'x 9'
Covered Area
Privy
4'x 7'
65'
55'
35' deep
No 1.
No 2.
No 3.
NASSAU STREET

ENTERIC FEVER AT PRINCETON.

BY EZRA M. HUNT, M. D.

The State Board of Health of New Jersey commenced an amination into the sanitary condition of Princeton, on Tuesday, ay 25, 1880. Vague reports had reached us that a fever of an ermittent or remittent variety was prevailing among the idents of the College. One student had died a week after noval to his home, but it was claimed that the fever had no ecial type, and the fatigue of transfer had increased the severity the symtoms. The disease was spoken of as malarial fever, a m not in use in any diagnostic sense in medical nosology. No se dates earlier than March 23d, probably none earlier than pril, during the first week of which several cases commenced.

THE TYPE OF THE FEVER.

Careful inquiry as to the symptoms and cause of the disease, l other physicians, as well as myself, to entertain the belief at all the cases could not be identified as of the usual periodic pe.

There seem to have been no new and well-declared cases in pril, after the first week. It would appear from inquiry among idents that many were complaining of headache and a de-essed condition of vitality, and many were taking some tonic edicine. But few were interrupted from class attendance until out the 8th to the 20th of May, when there was a decided crease of sickness.

On the night of the 25th, a student died somewhat suddenly, er a sickness of ten days. His case had been called malarial ver, or towards its close typho-malarial. The State Medical ciety of New Jersey was holding its annual session, at Prince-

ton, at this time. Some of its members, who had sought careful detail of this and the previous cases in April, were convinced that the fever was endemic in its character, and not of the usual remittent type. The case referred to had been seen that day by one or two of our most competent medical men. They had no doubt that the patient died of typhoid fever.

In addition we have reason to think that a majority of the students were not in a condition of health, such as generally exists in this college.

During the months of April, May, June and July, there occurred, in all, about forty cases of this, or a kindred type of fever, and eight deaths. The physicians of Princeton, some of whom regarded their first cases as remittents, and some of whom claim that there were cases that showed no typhoid element, nevertheless recognize that in the cases that proved fatal and some others, the fever was distinctly typhoid.

Of one of the first, if not the first case, I have the following detail from his own brother, an able medical practitioner.

PATERSON, June 5, 1880.

DEAR SIR:

Your letter to Dr. H. of Glen Gardner, was forwarded to me with a request to reply. My brother left Princeton April 8, 1880, reaching home in afternoon of same day, very much exhausted. He had complained of being sick some two weeks before leaving P., though able, through considerable effort, to prosecute his studies. While in P., his symptoms were loss of appetite, alternating diarrhœa and constipation, headache, slight fever and general prostration. Upon his arrival home, he at once took to bed, complaining of general lassitude, nervous irritability, fretful, and fearful concerning his recovery. My brother was telegraphed for on Saturday, the 10th, but did not get there until Sunday, the 11th. He found him as above described, except a sore throat. His first impression was that of typhoid fever, but on the following morning, he noticed what seemed to be the remains of a diptheretic membrane with general pharyngetis. The next day, Wednesday, I was telegraphed for. I left immediately, arriving there at 11, P. M. I found him with temperature 105°, pulse, 140. He had been delirious all day, and was partially so on my arrival. Under large doses of quinia and sponging, his temperature marked 103½°, at 8 o'clock, Thursday morning; in the evening of this day, it reached 104¾°. On Friday morning it again fell to 102¾°, but in the afternoon and evening of this day it again went to 105°. Saturday it continued

ly the same. Sunday there was no accurate temperature
n, as you will observe the reason where a full history is
d. He died early Monday morning, (1 A. M.) April 19th.
pulse, during the days before Sunday, ran from 120 to 140; but
unday it reached 160 and 180, and so feeble and rapid that an
rate count could not be made. There was delirium all this
of an active character. He was, until Sunday, able to
gnize an acquaintance, and call out the name when requested,
gh he was unable at any time to understand a conversation or
ake an intelligent reply, or in condition for any one to con-
e with him the last four or five days before death. The
ue was exceedingly dry, swollen and cracked; the fauces
and the same general appearance as the tongue. There was,
mes, a considerable secretion of yellow, tough mucus in his
at, which caused a good deal of choking. It was necessary,
mes, to clear his fauces and mouth with the fingers and wet
. Sordes covered the teeth. There were involuntary dis-
ges. On Friday, the stools were largely of blood, and were
e copious. The abdomen was tympanitic and very markedly
Friday, Saturday and Sunday. Milk and other fluids were
ited the last two days. There began, on Thursday, a consid-
le jaclitation. The flexor muscles of the arm and fore-arm
in an almost constant state of clonic contraction; this
nded to the muscles of the neck, face, jaw and eyelids. This
ation increased in extent and violence each day until his
h. The hands were fixed firmly upon the fore-arm, the
ers left their imprint on the palms of the hands and the fore-
upon the arm. He needed constant assistance and great
to control the constant movements. The muscles of the
r jaw were in such a constant tremor that it was almost im-
ible for him to swallow. The muscular spasm did not extend
e lower extremities until the morning of the 18th, the day
eding death, when the flexor muscles were more or less in-
ed. There was none, or at least very slight, oposthrotonos.
ink the head was thrown back slightly, though probably due
e spasm of the muscles of the neck. There were a few (three
our) rose-colored spots over the abdomen, which resembled
oid fever spots; they disappeared under pressure; they were
seen only three or four days. The vomiting was probably
ially due to the extreme tympanitic condition. His tongue
exceedingly dry and cracked, and at times he was unable
protrude it between the teeth. The teeth were completely
red with sordes. My diagnosis was typhoid complicated by
ation in basilic and upper spinal region. If there is any-
g more you would like to know, address me here and I will
e at once.

Respectfully yours,

G. W. T

Two cases which I saw in the earlier stages, about May 27th, were distinctly typhoid, and were so considered by the attending physician. On May 31st, being summoned by telegraph to see Dr. Wycoff, who had been taken ill, I saw for him his fever cases, six in number. Of these, four had the typhoid rash, and all had the symptoms generally accompanying typhoid fever. Prof. Austin Flint and Prof. E. G. Janeway saw other cases which satisfied them that the disease was enteric fever. I have heard directly from several cases which were treated by able physicians, at the homes of the students in other places, and which were distinctly recognized as typhoid. In the cases of death, most of them had serious hemorrhage from the bowels, and in one case death was sudden, as believed, from perforation of the intestine. Most of the cases had the rose-colored or lenticular eruption. The only case in which a post mortem was hoped for failed by delay of communication, but it scarcely seemed necessary to confirm so many agreeing diagnoses, except as such evidence is always valuable as corroborative. There were, in some cases, variations such as raised the question whether there is a fever which may be called sewer fever, in which the blood poisoning is modified from the abdominal typhus of the Continent or the typhoid of Great Britain; also whether in two or three of the cases there was a malarial element sufficient to justify the term typho-malarial.

Two years previously we had under observation, under similar circumstances, over one hundred cases of typhoid at the Reform School, at Jamesburg, which, like some of these in their inception, were regarded as remittent. A study of the details of that endemic, as given in the State Report of 1878, is an instructive introduction to the etiological study of this Princeton outbreak. Its last page of warning may get new emphasis from this trying repetition. The study of the two, side by side, while showing some of the milder types of the disease, some of those variations which are recognized, do not affect the identity or the identification of the fevers.

COURSE OF INVESTIGATION.

From verbal inquiries made, I became so concerned as to the probability of local existing causes, that I remained after the *adjournment* of the Medical Society, on the 26th of May, for the

urpose of knowing as to the water supply, and examining into
e sewer and indoor appliances of the college building, so as to
nfer with the other members of the State Board of Health. It
id not take long to discover some serious local defects, and such
made it evident that it would be our duty to make an examiation in detail. A note addressed to our Board the next day,
the City Clerk of Princeton borough, asked an investigation
the interests of the town. The death of one student on the
th instant, and of another on the night of the 26th, who was
ffering from fever, together with the opinions expressed by
any physicians, caused much alarm. On the 27th, I telegraphed to the City Clerk to hasten forthwith the organization
a Local Board of Health, which had been neglected. The
th I returned to Princeton to carry on the work of investigation, and continued the examination of the water supply of
e college buildings, and its entire system of sewage.

WATER SUPPLY OF THE COLLEGE.

The supply of water was derived from a spring on the ground
the rear of the college buildings. This spring was carefully
vered and protected from all outside contamination. The fall
evious it had threatened to fail in furnishing an adequate supy of water, and so had been enlarged into a kind of well. It
as about eight feet deep, and collected the surface-soil drainage
om the direction of the college property, through a soil
irly adapted for percolation, along the row of buildings
arest to it. Several hundred feet distant had formerly
od the privy resorts of the college. It was known to the
cretary that several months before, in an examination of the
derground of a dwelling house on this line, there had been
und an amount of organic material out of all proportion to
y natural condition of decaying substances in soil. The
amination had been made on account of sickness in the
nily. While it was alleged that this was local and that the
nd of the underground was such as to feed this large surfaceill from another direction, it was plain that such a source of
ter supply can only be relied upon when it came from surface
l kept clear of organic filth of all kinds.

So long as such a spring or surface-well is in an open country
strict, and so long as *the ground* soil through which it perco-

lates is fitted to act as a filter, and is itself free from undue organic matter, the water is likely to remain pure as this seems to have done. It had of late been carefully watched and examined by the Professor of Analytical Chemistry. There is not reason to believe that up to this time it had suffered from the infusion of any sewer material into it, or that it had become fouled by organic matter in the soil. Yet as increase of population in a town like this always subjects natural surface springs to sources of befoulment, it is not safe to rely upon such an one for a large permanent water supply in such a locality.

RESERVOIR.

Another question as to water supply arises from the method of storage. This water was carried by an iron pipe to a reservoir situate about fifteen feet from a large artificial pond, formed by the damming up of the storm and drainage water from the direction of the college buildings. At one time more recently, the water in the reservoir was found on chemical test to be of a lower standard of purity than that of the spring tested at the same time. The amount of water used in the college buildings also leads some to believe that the reservoir obtained a supply not only from the spring but also from the adjacent pond and grounds. It was not a cemented reservoir.

It is probable that the reservoir had, at times, some supply from such sources. Although this might give more of the products of vegetable decomposition, it is not so seriously different in source from the spring supply as to furnish adequate reasons for the prevalent sickness. The water from this reservoir was pumped, by an engine, into one of the colleges, and from tanks, distributed to the various buildings. These tanks were never intended to become dry, and have never been known to be but once or twice. The tanks were not, in every respect, the best, and yet nothing was found in these to account for the sickness. While then this water supply, as a permanency, cannot be depended upon, it is not believed that, up to this time, it had been the cause of any sickness of a typhoid character.

IMPERFECT DRAINAGE.

ıestion here arises whether any evil results, in the form of
lid occur from the ponding of water and the interference
ıatural drainage, which is to be found in the rear of the
buildings. Since, it is claimed that, beside typhoid, there
ɔme cases of remittent and intermittent fever.

ground below it in the vicinity, is wet and somewhat
y, and is in a condition favorable to interrupted or abnor-
ɛgetable decay. Water is now believed to be a conveyan-
miasma, when it is derived from low ground and from
shy vicinity. The evil cannot be detected by chemical
ıation. Both the well which furnishes water to the col-
ıd the undrained ground which furnishes malaria to the
ıld easily furnish elements which, combined with local
cation of a nosocomal nature, must give rise to a fever of
alarial character. Princeton is naturally one of the
est of towns, and free from malarial influences, as the tes-
of all the resident physicians shows. It can only be
ınhealthy by neglect of, or interference with natural drain-
d by the accumulation of evils incident to congregated
While we believe the drainage of all this district has been
hat neglected, and much construction done without proper
ation therefore, it is not probable that this was the exist-
ıse of the outbreak.

le thus presenting the facts as to the drainage and water
of the college, our conclusion is that we were unable to
it adequate reasons for the outbreak of disease at this

HEATING AND VENTILATION OF THE COLLEGES.

ıe fever had occurred in the spring, it was not found nec-
to make an exhaustive examination as to the modes of
ɡ and ventilation in the college buildings. The heating of
dormitory buildings is by open grates or stoves, with the
on of Reunion Hall, which is heated by steam coils.
some defects might be noted by experts as to facility for
l ventilation, yet none of those examining the buildings
sposed to attribute the sickness to structural defects as to
ıatters.

SEWERAGE AND WATER-CARRIAGE SYSTEM.

Our first examination, made on May 26th, was in three of the buildings, commencing in Witherspoon Hall. It was found that each entry was supplied with a small iron trough, similar to a kitchen sink. Over each of these was an iron pipe with a faucet communicating with the tanks and water-supply already described. All water used in the college was furnished from them. These troughs received all the liquid slops of the college, including all waste and chamber water. These had the S or Adee trap and ended in an upright soil-pipe. This passed from the various stories of the building into the continuous soil-pipes, until from the various directions they united at the Witherspoon Hall, carrying the liquid refuse, and also receiving the storm water from the leaders in time of rain.

Near where the soil-pipe and water closets pipes join, and on the inner side in Witherspoon Hall, there had been built a ventilating flue connected with the chimney, for the purpose of securing perfect ventilation between the large sewer main and the buildings. There had also been made a man-hole or ventilation opening into this main sewer, a few hundred feet in the rear of Witherspoon Hall. The workmen seemed to have mistaken the ventilating flue for a part of the chimney stack, and had gone round it with the sewer or soil pipes, avoiding connection. The man-hole outside had also been made tight and covered with ground and sod. So there was no inlet for air between the sewer main and its cesspool, and the water closets and entry sinks of the colleges, save what might be furnished by the storm leaders near the roofs; these, in times of storm, might siphon the ventless traps. The pressure of the sewer gas must often have been sufficient of itself either to siphon the traps or to force itself through. It is known that these traps were, at times, empty. This is made still more obvious, as we follow on, to notice the condition of the cesspool at the terminus of the sewerage system. This tank was built underground, beside the railroad track; it is an oval, fifty feet long, eleven feet deep, and eleven feet in its oval diameter; at each end it had a man-hole covered with a heavy iron lid closely fitted and covered over with earth. This cesspool was not cemented on the bottom, and was laid with loose stone part of the way upward; the sewer system from the

lege entered it by a pipe about four feet from the top; there
s an overflow pipe at the other end, two feet from the top,
ich thus made a water seal, and had generally served to carry
the super-abundant sewage by a pipe running for a few hun-
d feet underground and finally discharging itself along the
road and upon the surface of a low tract of land. It appar-
ly had been thought that the cesspool with its uncemented
tom would absorb much and that the rest would easily flow
and that if, at any time, the floating matter in the cesspool
ome solid or cake-like, so as not readily to flow off, the flush
torm water from the roofs, at intervals, would answer for this
pose.

Prof. Brackett and myself first got access to it May 27th, one lid
ving been loosened the day before. This large cesspool was
nearly to its top with a black, tarry, offensive sewage. This
ered the incoming sewer pipe from the college to the depth of
) feet with a semi-solid mass, from which the foul escaping
es were bubbling. It was so tenacious as to stop up the
rance of the sewer pipe from the college, except as the back
ssure become sufficient to cause an intermittent discharge. All
vage came from that direction without getting vent. The pent
gas in the pipes had but one ready escape and that was into the
lege buildings. Thus the soil pipe and water-closet system of
) college was but an elongated cesspool with full arrange-
nts for gas-discharge on each entry, both from the slop
d water-closet apparatus, as the pipes of the latter joined the
mer near the buildings. Although the large cesspool had at
lower end an overflow pipe, intended each day to carry off
y surplus, in the warm months of this spring, and the absence
rain, the mass between it and the sewer pipe had become too
id to be easily flushed off and too putrid to be retained.

With right traps in the buildings, with perhaps the addition
opening to the soil pipes on the roofs, and also vents to the
aps as recommended of late, with the intended attachment
the chimney flue, and an open man-hole for free access and
ress of fresh air, with watchfulness over the cess-pool to see
at it was in working order, and with emptying when required
contingencies or by lapse of time, we can easily see how such
system might have been operated. But as it was it had
en converted into a complete system for the storage of the

fouler part of sewage, so that its gases might be sent to the college buildings with the same precision with which lighting gas is kept in a reservoir and distributed through houses. Only in this case there must have been more constant escape. At the time of emptying this cess-pool, immediately after the adjournment of the college, there was also some sewage inflow from the direction of the colleges. All the buildings known as Witherspoon Hall, West College, Reunion Hall and East College, as well as the University Hotel, were connected with this system.

The School of Science and some other buildings were connected with just such a system and with like defects, which had its terminus in a smaller cesspool on Smith street, and was in no better condition. It is easy to see how, by such a state of affairs, the air of the college buildings could be laden with particles or so impregnated with aerial sewage and gases as to be deleterious to health. There can thus be no doubt that in the college buildings, in the University hotel and in one of the Professors' houses, there were found soil-pipe and water-closet connections highly favorable for the introduction and extension of foul air in the form of aerial sewage.

Only two questions confront us: As a matter of fact, did the disease commence in the college, or from a similar or still worse condition, in a students' boarding house? Wherever it commenced, was it of spontaneous or local origin, or was it introduced from some other focus, and then spread by these favoring and fertilizing provisions therefor?

FIRST CASES.

To throw light upon these questions, an examination of the earlier cases is of primary importance.

By the kindness of the college authorities, I early received a list of all known cases, with the places of rooming and of boarding specified, and have verified the dates of attack. These are given without repetition of the names, and with some slight alternating corrections, as furnished by personal inquiry and correspondence.

	ROOM.	CLUB.	REMARKS.
Upper	A House No. 2	House No. 2	Remittent fever; Scarletina, (?)
	B 13 S. E.	"	Left here April 8th. Died 19th.
	C 10 W. M. Witherspoon	"	Left here sick early in April. Had Typhoid fever at home.
	D Dohm's	"	Left here April 5th or 6th. Typhoid fever at home. Dr. Fay, Altoona.
	E 10 N. R. H.	"	Sick in Princeton with Typhoid fever early in April.
	6 N. M. R. H. Colored housemaid.	"	Left April 1st. Sick at Auburn with nervous fever. No Typhoid fever. April 29th, removed. Sick two months.
Middle	F 10 E. W. H.	Univ. H.	Chill May 16th. Died May 26th
	G 12 E. W. H.	"	Went home sick May 24th. Typhoid fever at home, Madison, N. J.
	H 5 E. W. H.	"	Went home sick May 25th. Sick at Manhattan Beach Hotel.
	I 4 W. M. W. H.	"	Sick here May 12—26th. No Typhoid development.
	J "	"	Sick May 23d. Still sick here, (Aug. 20).
	K 2 E. M. W. H	"	Sick and went home about May 24th. Came back about June 1st for part of two days. Returned home and died June 6th.
Lower	L 5 S. M. R. H.	Jesse Williams	Sick here from May 9th to 27th. No decided typhoid symptoms.
	M 15 N. M. R. H.	Univ. Hotel	Went home sick May 24th. Had Typhoid fever. Wilkesbarre.
	N 7 S. R. H.	"	Taken sick about May 15th. Went home May 22d. Died June 10th. (?)
COLLEGE.	O 13 N. E	Lavake's	Took cold, April 1st, lying on ground. Went home May 20th. (Doubtful case).
	P 18 N. E	Univ. Hotel	Went home sick May 17th. Had Typhoid fever.
	Q 3 N. W	Mrs. Harvey's	Taken sick about May 20th. Very marked case. Died July.
	R 6 N. W	Univ. Hotel	Same as above. Died July.
	S 1 S. W.	Clow's	Left about May 15th. Returned May 20th. Went away again May 25th. Sick in Newark. Died June 5th.
IN TOWN.	T M. House, No. 22.	Parkhill's	One of the first sick, about March 14th. Went home about April 12th. Returned to Princeton about April 17th, and was again sick for a few days, but recovered here. Attended by Dr. Wikoff, who says his was not this fever.
	U M. House, No. 19.	Univ. Hotel	Went home sick May 26th. Called Remittent fever up to May 31st. Died June 6th.
	V Mrs. L.'s	"	Went home sick about May 26th. Typhoid fever in New York.
	W Mr. L.'s, Canal street, previously at Lavake's	"	Had chills and fever about March 1st. Went home, returned, and was taken sick about May 10th. Typhoid symptoms.
	X Univ. H.	Univ. H	Complaining during second session while in 12 W. W. H.; moved to hotel about April (?) 21st. Died May 26th.

It is at once noticeable that the first seven cases of sickness occurred among those who cannot be associated as in any one part of the college buildings, or in any one place in town as to rooms, but who were alike in the one particular that they all ate in the same house. Of these, two lived only in the house, and one other had a room in town elsewhere. The others were in three different college buildings. One student was slightly sick in April who was not of this group—although named in another part of the list, it is evident from the account of his brief indisposition that he had no typhoid symptoms. Of these seven, six are reported to me as having had typhoid fever, unless one called nervous fever is an exception. Four of these were taken to their own homes and recognized as typhoid fever by their physicians there. The seventh one is claimed to have had remittent fever, and to have broken out with scarlet fever after he had been in his room over two weeks. His case was reported as beginning March 23d. The first student who died, and whose case has been already related, was taken sick March 26th, or as the brother's letter would date it, about two weeks before April 8th. Four other cases were taken so simultaneously, April 5th, as to lead the physician to suspect that there was some local cause and to make inquiries as to the well water, etc. Previous to these cases there were none of earlier date, which, before or afterwards, were identified as typhoid. These facts are so significant as to invite to close inquiry.

HOUSE NO. 2.

This boarding house was situated on the main street known as Nassau street, being the second house west from the First Presbyterian Church. One student boarded with the family and roomed in the house. The family consisted of four adults, including *servants, one of whom* had typhoid fever about April 25th. Two clubs boarded in the house, one consisting of thirteen college students and the other of thirteen seminary students and a college tutor. Why none of the seminary students sickened can be accounted for, the same as why only seven out of the whole number in the house sickened, or on the hypothesis that college students sickened because of the additional and constant exposures in the college buildings, or on the hypothesis that the cause of the sickness was only in the

leges. Against this latter is the fact that so many sickened e and here only at first; that one was a servant in the family, l that one other not including the remittent fever case, roomed well as boarded outside of the college. As two other houses :e in close proximity and had either water or cesspool rela- ıs, we show on the accompanying map their position, the ldle house being the place of sickness.

[SEE MAP.]

This house, No. 2, derived its drinking water and its upstairs ıh water from a well located between houses No. 2 and 3, the ıses being separated just enough to allow space for the well. e well is about thirty-five feet deep, and very old. The first ıness led to an examination of this well. The water, al- ıugh it had not been complained of, was found so bad on ımical analysis, that Professor Cornwell thought that it could ; be defiled by sewage alone. We tasted it in June, after it l ceased to be used, and could detect no foul taste, although was chemically impure. In the front yard of house No. 2 was overed cesspool, forty-eight feet from the well. This received ı water-closet excreta of the house, and the bathtub water. ıe size is about nine feet deep by four wide. When examined, out one foot of semi-solid fetid matter was in the bottom. As ı structure directly beneath is rock, the cesspool matter all ıng this section is only absorbed and disseminated laterally.

The next nearest cesspool is in the rear of lot No. 2, nine feet p and five wide, and sixty-five feet from the well. At the e of examination in June, it had seven feet of water and filth. n the yard of house No. 1 was another cesspool found in a l fouler condition, into which both the kitchen slops and er-closet refuse was received; this was seventy-five feet from well of No. 2, with a foul privy in between. It was only nty-eight feet from the well of No. 1, which was foul, and ich is of the same depth and same water-bearing strata as the l of No. 2.

The only chemical difficulty in discovering whether sewage tter was percolating from these three cesspools into the well No. 2, arises from the fact that there was a dead cat in the ll. There was so much cat as to make it difficult to determine ether three cesspools, distant forty-eight, sixty-five and

seventy-five feet respectively, were also fouling it. The Chemical Professor thought there was more of the chlorides and albuminates than the cat would account for. The well is large and deep, (thirty-five feet,) and like most of the wells of Princeton, of this depth, cannot be pumped dry by usual method.

This water was used for drinking purposes and to different amounts by different students. Some of it was each day pumped into the up-stairs cistern for general water supply, communicating chiefly with the room in which one of the students was sick several weeks.

Besides these conditions, as to water, the house was provided with unusual facilities for the introduction of foul air. The cesspool of house No 1. was in the area, within twenty-eight feet of house No. 2, with the privy a few feet nearer. The rear cesspool of house No. 2 was fourteen feet from the house, and had from it an untrapped pipe in the area basement for receiving slops thrown into the sink. There was a rain water cistern under the plazza, which had its overflow pipe into the cesspool, and which thus let foul air into the area. Then in the brick floor of the basement there was an outlet for slops. In heavy rains the cesspool overflowed its filth water into the area so as to cover it. The dead mawkish odor, peculiar to confined sewage, had been frequently observed. As the property, when purchased, had these conveniences, the localities of cesspools, pipes, etc., and their connections were not known. The soil, beneath and about the building, was saturated with organic matter. The condition of the water supply, added to that of the cesspools, presented a more flagrant and dangerous complication than any found in the college dormitories. Both Professor Janeway and myself, who had occasion to act with E. S. Philbrick, of Boston, as a committee for advising what changes should be made, came therefore, to the conclusion as herewith expressed.

"The disease was typhoid fever, caused in the first instance by the use of water from a well, which was proven by chemical analysis to be impure, in which a dead cat was found, and having such relations to cesspools, as shown by subsequent investigations, as to render its contamination by them extremely probable. We have been forced to this conclusion by the fact that the first cases of typhoid fever amongst the students during April, occurred in those boarding at the house using this well water, and

ıse these students who became ill lived in different build-
Moreover, it has since been ascertained, that a servant
worked at this house, became ill at this same time, was
ved to another house, and is considered by her physician to
had typhoid fever.
e evacuations from the students who had become affected in
nanner were thrown without disinfection into the sinks and
-closets in the dormitories, and gained access to the sewer
n of the college, and to the cesspools which formed a part
A subsequent outbreak of the fever occurring in May,
:aused by the infection of the sewage of the college, con-
l in the aforementioned cesspools and pipes. On this occa-
:he disease was not limited as before, but followed the sewer
bution. The poison gained access through the sinks, water-
s, and the pipes connected with them.
e spring water used at the college has been analyzed a
ɔer of times, but without affording any evidence that it
ontaminated; and we are informed that it has been used at
al houses having a total population of about seventy per-
but having no connection with the sewer system, and that
has been no sickness in these houses. The view might be
tained that the foul-air conditions of the house co-operated
the water conditions and shared prominently with it in
ient causation, but at any rate it seems well-nigh certain
:he local structural conditions in and about the house were
xciting cause whether through fouled water or fouled air."

THE FEVER SPONTANEOUS IN ITS ORIGIN AS AN ENDEMIC HERE?

ɜ question now arises whether the enteric or typhoid was
nted in such a favoring soil from some other person or
ty or whether it originated amid these favoring conditions.
well known that on such a question there are still two
ite opinions. One class of medical observers maintains
ike small-pox "the disease breeds so true that no fresh case
ɔwn to arise except by contagion or infection from some
ɔusly existing case." As the view has gained ground that
ɐecific element in the communication of diseases associated
the name "zymotic" is not volatile but "particulate" in that
a substance not gaseous but solid, and so a particle, it must

be conceded as Russell has recently expressed it, "that the progress of discovery on the laws of the particulate theory of the contagia makes constant inroads upon the domain of the spontaneous or transcendental in the origination of communicable disease." So there is maintained "in the mind of the ætiologist a wholesome attitude of thorough skepticism as to the spontaneity in any instance of diseases known to be in some instances lineally propagated from pre-existent cases through ascertained media."

Dr. William Budd may be quoted as representing those who always look for a pre-existing case from which the infective particle was derived, either in person or through air or water, contaminated by the fecal discharges of the patient, while Sir William Jenner and Dr. Murchason represent those who, while recognizing this source, also believe that it may be generated independently of any previous case, and especially from excretions and from sewer fermentation and decompositions.

Dr. George Wilson, in his recent book on "Healthy Homes," says, "some writers maintain that genuine typhoid fever can only be propagated from a previously existing case or cases; but there is a constantly increasing amount of evidence which goes to prove that it is often induced by sewer air, foul effluvia from cesspools or polluted water, independently of any previous cases." (pp. 293.)

It therefore becomes the duty of any investigator—even if finding conditions highly favorable to the epidemic extension of any disease—to inquire whether its origin, after all, was not from some place, whither it had been brought either by a person sick of the diseases or by some medium that might have been infected from him or from his sickness. It has been said that enteric or typhoid fever is the most versatile of all the communicable diseases in its choice of a medium. (Russell.)

Since the conveyance of typhoid fever through milk that has either been watered with fouled water, or has absorbed infectious material from typhoid surroundings, has been proven, our first inquiry was in this direction. No clue could be found to any possible derivation from the source. Care was taken to trace the first cases to their home relations, to their absences from college, or to some other circumstances that might furnish evidence of *transportation*. While in the case of so composite a gathering, *and of so* many conflicting statements which have to be elimi-

ıd, it is well nigh impossible to make such an inquiry ex-
stive. After tracing carefully every possible or suspected
ce, we were not able to identify this as an imported disease.
ral suspected sources failed under extended investigation.
next natural inquiry was, whether cases of typhoid fever
previously occurred in other parts of Princeton, the infec-
of which might have, in some hidden manner, reached the
lity of house No. 2, so as partly to assume an epidemic form.
was found that it is true of Princeton, as it is of most such
l towns with no Boards of Health, that causes for local dis-
s exist. Also that occasional cases of typhoid fever occur as
ıght from without. By careful inquiry of the resident
ıicians, and examination of the vital records, it was found
there had been no case of typhoid fever in Princeton pre-
s to this outbreak, within two years. Six years ago, and
n five years ago, cases occurred in town which were known
ave been brought from other places. Three years since there
) five cases in one family. In these cases it was believed
he time, after chemical analysis, that a filthy cesspool had
ıd its way into the well, so as to foul the drinking water.
wo years ago last March, there were two cases in a professor's
ily, who lived in a hired house in the town. The well had
) dry, and it was necessary to blast in order to deepen it.
r the water was secured it began to taste badly, and an odor
perceptible from the well. The sickness soon occurred. It
believed in the blasting a crack had been made which com-
ıicated with a cesspool. The well was abandoned and
'ward filled up because of its odor. We could not obtain any
which would, after so long an interval, associate any of these
s with those now occurring.
s it has been alleged that low forms of fevers have before pre-
ed at Princeton, we examined closely the records so far as
lable. We found ex-President MacClean, from a ready mem-
able to give details which were corroborated by Dr. Stephen
ıander and others. The record, both of the college and the
ı, has, with rare exceptions, been one of remarkable health.
s said that twenty years at a time have elapsed without a
le death of any student from any sickness at Princeton.
ıittent fevers, except about the time of the digging of the
l, long years since, have been almost unknown. This year,

in the surrounding country, there has been more than usual of remittent and intermittent fever. It has generally been so rare that all the physicians have regarded any occasional case as an importation. Yet it is evident that structural changes, excavations and interferences with natural water-courses need here, as elsewhere, to be guarded against or compensated for. Three cases of typhoid fever occurred in the house of Dr. Farmer. He died, as did also one student of the college.

In 1835–6 occurred what has been spoken of so frequently since this outbreak as the *Princeton fever*. It was confined to one house and this happens to be house No. 1 of our map, and what may be regarded as a part of the same plot in which the first case occurred this year, since it is only separated by a few feet used in common. In the house, now occupied by Dr. S. Alexander, there were then five deaths from typhoid fever, and one or two more who recovered after prolonged illness. One student died and two physicians in succession. The sickness was attributed to the well, which was found to be receiving the household slops. The well was long known as the *sickness well*, and was abandoned for about two years, but is now used, although found in bad condition at the time of our examination. No sickness has occurred in that house since, which could be attributed to any local causes, although the family of adults is believed to have suffered in general health from impure air and water. The fact of locality, so far as the present epidemic is concerned, we can only regard as a coincidence, and as having no causal relation. The fact of a graveyard having once existed in the rear of house No. 2 was also brought to our attention. It was found that some seventy years ago there were, several hundred feet from the house, five or six gravestones, probably the remains of some family ground before the college was located at Princeton. "There have been," said President MacClean, "no burials there in the memory of man."

It would seem, from all the facts that we gathered, that typhoid fever commenced here only because of certain more recent and local structural conditions, and was extended into an epidemic by prevalent conditions in the college, as also in a few houses in town.

That the fever did not get a more rapid and disseminated hold at the time, is to be accounted for by the fortunate occurrence of

the Spring vacation, and the fact that none of the earlier cases remained in the college buildings. About two weeks after the return of the students, April 22, new cases began to appear, which might easily occur from excreta, or the continued operation of the same causes, or from the predisposition which had been established.

So soon as the cases were recognized as typhoid fever, dependent upon local causes, all officers of the college were prompt in ordering an adjournment. We believe thus only was it saved a far more wide-spread and fatal epidemic. At the very day of adjournment we found the excreta of typhoid fever patients being emptied in a common water closet, and believe that the seed had been sown for a prolific harvest of death. However sad the record, with all the facts in evidence before us, we rejoice that the scourge was not more intense in its virulence and more wide-spread in its desolation.

CLIMATIC OR WEATHER CONDITIONS.

The question occurs whether there were at this time, either in thermal or atmospheric conditions, any reason why the material of cesspools or sewers should thus become operative, or why soil or air or water should be unusually impregnated, or persons have an unusual predisposition to such influences here. It is fully recognized that conditions of temperature, moisture, and prevailing winds may determine the outbreak of an endemic or epidemic disease. These would be inoperative without the necessary materials to operate upon were present in the soil, in the atmosphere, in the food or drink, or in the person. On the other hand the material might be present in any one or all of these, but be restrained in operation because of the absence of the heat, moisture or other conditions necessary to development.

A record of the meteorology of the year from July 1st, 1879, to July 1st, 1880, and especially of the latter six months, shows some exciting causes well worthy of attention.

We refer our readers to our tables for this period as worthy of study on another page. The winter was an unusually open one, with much less frost and ice, and with a smaller amount of rain than usual. The average temperature of February, March, April and May was much higher than ordinary.

The deficiency of rain was such as almost to occasion a March drought. The accompanying graphic map presents the lines of temperature, humidity and rain-fall from January 31st to May 31st, 1880.

The failure of flushing the sewers of the college, which depended so much on sluice-water, has already been noticed, and no doubt contributed much to the filling up of pipes and the influx of sewer air.

It affected still more the wells which are the vertical drains for an area of which they form the center. If the ground about them is filth sodden, or abounds in organic matter, or if having combined with cesspools it is never so sure to pollute the water supply. The favorite and only and time-honored method of sewage disposal in Princeton Borough is by uncemented cesspools in the rear yard and often in the front yard, and sometimes in both, nicely covered over and sodded. They are expected mostly to take care of and empty themselves. That means that the ground soil shall so absorb the liquid and muck of the semi-liquid and fecal matter as to make the need of emptying the exception. This may do for a time where population is sparse and regulations enforced, or longer where the water supply is not derived from wells. But it is a most hazardous experiment when it is followed up in a compact town, and only awaits favoring warmth and weather to stir these multitudinous cauldrons into activity, and with a soil unusually and unseasonably dry and warm, the first natural diversion is the well. As this cannot afford full relief, the air undertakes to be a corrective and so becomes the common carrier of whatever effluvia may arise. Some parts of Princeton are kept with scrupulous care, and the objectionable conditions are flagrant only in one or two small sections, or in here and there two or three adjacent houses as they were in the two houses shown on our map. A dead animal in the well—three cesspools within seventy-five feet, tainted air from these and from the overflow in the house, and the previously favoring weather conditions seem to have precipitated the crisis. The condition of the college sewers and of some town localities favored the progress of the infection.

The college having been dismissed and this deportation as the first thing resorted to, it is proper to note some of the means advised to overcome the disease, and to insure against recurrence.

1st. The cesspools were emptied, cleaned and disinfected.

2nd. All the sinks and the water-closets, and the pipes which connected them with the cesspools have been removed from the buildings; and the pipes outside of the buildings have also been taken up.

3d. The rooms have been cleaned, and those in which sickness occurred have been disinfected.

4th. The use of cesspools has been given up and a temporary arrangement provided which will avoid liability to disease. A permanent system of sewage and slop disposal is in course of construction, which is in accord with the development of sanitary science. Mr. C. E. Philbrick, Civil Engineer, of Boston, Mass., has charge of the construction of the new system. The water-closets are located in a separate building and have no connection with the dormitories.

5th. Two large cisterns have been built to hold filtered rain-water, collected from pure sources, to be used as drinking water.

6th. The house where the disease originated has been thoroughly overhauled.

7th. It was recommended that students be prohibited from boarding at houses in a defective sanitary condition.

This latter was rendered necessary from the fact that very insanitary conditions were found on the premises of several boarding houses. The location of many wells and cesspools was such as to make it obviously unjustifiable to expose students to the possibility of such soil and water contamination. This was made the more obligatory from the fact that scattered cases of typhoid fever had occurred in the town during the vacation, and even when college assembled, although it had been put in so thorough a sanitary condition, the fact of existing cases in town made it necessary to protect the students from such possibilities. It was unfortunate that the Health Board of the borough did little during the summer, but we believe that it is more alive to exigencies which exist and which must be remedied upon a plan.

FUTURE WATER SUPPLY AND SEWER SYSTEM.

Either the uncemented cesspool system, or the wells must be abandoned in Princeton. It is hazardous to secure drinking water from the same soil in which these exist in near proximity;

with the soil and understructure of Princeton it is aboslutely unsafe.

The water-bearing strata of the borough is nearly the same in its most closely inhabited sections; it is reached through deep wells and rock, so hard as often to require blasting; the water as thus secured would be good if no surface matter could reach it, but the rock extends within a few feet of the ground surface; it is a hard shale arrayed in layers. This compact rock causes organic matter to remain near the surface, or if liquid or semi-liquid, as it must become through accumulation and by storm water, it forms into streams or little trickling rivulets along the surface of the rock. It is found that this rock is blocked off, or has frequent seams or joints, so that at points not suspected and sometimes quite distant from some series of cesspools, the foul substance can find exit and so reach wells, and mingle at the water bearing strata. These joints are much more frequent than in trap rocks. Here and there a well is thus known to be impure where there are no cesspools immediately adjacent. Such a condition as this demands either a constant watching and testing of almost each well used, or the prohibition of uncemented cesspools, or the use of cisterns, or the procurement of a water supply away from any possible household or populous complications. The risks are greater to the town than to the college, since the buildings of the latter need not be closely located, and its facilities for collecting and storing water from the buildings are greater.

In reference to all that relates to this outbreak of enteric fever at Princeton, it must only be said, that in its chief feature it is only a repetition of what has elsewhere occurred over and over again from similar causes and complications. There are many towns that just after this fashion are storing up material for just such sickly and deadly use in the future. By a want of co-action or co-ordination of conditions of water, soil and weather and susceptible live material, the evil day has thus far been postponed. Some have postponed the evil by securing a separate water supply. Although still polluting the ground, its results are, for a while, delayed by nature's conservatism, or by flight to the sea shore, or other methods of avoiding the continuous inhalation of polluted air, or when such air is inhaled, if it is common foulness and has not yet attained to specific contagion, it only causes

that general malaise and weariness and half force which devitalize and demoralize population, and so is now sapping vital power by insidious inroads, instead of decimating by virulent epidemics. There was no other way to convert New Orleans and Memphis to correct hygiene except to have yellow fever. It may be that our New Jersey cities, will continue to foster insanitary conditions until they too have some significant losses, or until there is a general reduction of the standard of good health, so pronounced, as to exhibit itself in the statistics of mortality. Still with the noble advance made in our own State in the last three years, and with an increase of intelligent popular sentiment and official power, we cannot but hope that many of our cities and townships will, more or less rapidly, put themselves upon a better health basis, and secure for themselves and for their homes, that blessing which, more than any other human gift, tends to life, liberty and the pursuit of happiness.

SANITARY INQUIRIES INTO ALMS-HOUSES AND JAILS.

BY WM. M. BAIRD, M. D., WASHINGTON, N. J.

With civilization we have the care of the criminal and depen-
nt classes to engage our attention; and that they may be cared
at the least expense to tax-payers is an important considera-
n. But a higher and more important consideration is the giv-
g of such care as will lessen the numbers of these classes in the
ture. Indeed, as a matter of economy to tax-payers, it is not
much what it will cost per diem to support these classes, as
at measures shall be inaugurated to make the greater number
these dependents self-supporting, and to cause the largest pro-
rtion of the criminals to lead honest lives, that society will not
forced to protect itself by confining them.

The part that race, inheritance and various physical defects
ve to perform, I take it is the part of the subject our State Board
Health wishes to grapple with. That these, in various forms,
ve much to do with producing these social diseases is only too
ie. As directed by the Secretary of the Board, I made a visita-
n to several counties and only confirmed my previous opinion
at many needed reforms were necessary before New Jersey
uld be up to the times in the care of her dependents and crim-
als. The majority of the people and, indeed, of officials appear
think that if they are well housed and fed that is all that is
cessary; that to consider the subject in its higher relations is
perfluous. The consequence is that a needless expense is en-
iled on the tax-payers of our State, and the prevention of pau-
rism or crime receives but little attention from the masses.

JAILS.

I visited the jails of Warren, Morris, Essex, Union and Somer-
t counties.

WARREN COUNTY.

Warren county jail is in the Court House, at Belvidere, the county seat. A recent Board of Freeholders remodeled the Court House and rebuilt the jail. It was originally built in 1825, and rebuilt in 1870; constructed of brick, it now consists of a new and old part. It is seldom that more than a few prisoners are confined in it. Cells are built so that the back walls of two cells abut each other. As soon as prisoners arrive they are taken to a bath-tub and given a bath, and then assigned to their cells. The court surrounding the cells in the new part is quite well lighted, and natural ventilation has a fair opportunity to do what common sense failed to do. In the old part the court is not so well lighted or aired, but the height of ceiling, the cleanliness observed and few occupants, make the air supply very good during the day. The cells are ventilated by a hole opening in an air flue, common to the cell and the area back of it. I found no draught at the air holes on holding a lighted match to the opening. No arrangements are made for forcibly removing the air, and the ventilation of cells is sadly defective. The cells in all prisons visited by me are small and the arrangements for thorough change of air should be very complete. In this jail a frequent whitewashing does much to keep the air sweet; the excretions at night are received in tin pails with covers. In the jails are water-closets for use during the day. There is a privy in the out-yard. The water-supply is from the Delaware river, and is furnished by a water company supplying the town. A plentiful supply of water is had for cleansing purposes and for flushing pipes. Slop water and excreta are carried into a large cesspool in the back yard. This pool has no ventilation other than through the ground covering it. The jailor says there is *said to be* a cistern under the new jail. This, being confined and without ventilation, may be the means of not only breeding disease to certain criminals there confined, but to others whose province it is to mete out justice in the rooms above. The danger from this is not so great, however, in your reporter's opinion, as it is from the fact of having a good water-supply and very bad method for the disposal of sewage. The officials stated that they believed they had good traps. But when sewage is run into a cesspool tightly covered and there generates gases, and

n more sewage is run into the pool, this will either compress gas or it will escape somewhere. Undoubtedly a great deal through the tank and passes off through the pores of the , but, unfortunately, the covering does not always permit it to off rapidly enough.

When pressure is brought to bear by this compressed gas in trap, I fear the trap that will prevent its escaping in the rtments behind it has not yet been patented. The county is so much to blame for this negligence as the town, for it is town which will have to suffer in the future by its soil being thoroughly impregnated with sewerage matter.

DIETARY.

o regular dietary is had for each day, but the aim is to give prisoners a change of diet. A physician is appointed by the rd of Freeholders, and is required to attend whenever called when he deems it necessary; he is also required to furnish his medicines without extra pay. The only labor imposed on ates is caring for their apartments and cleaning up, whitehing, &c. Tobacco is furnished to those who use it and the unt expended last year for this important article was $9.35. oholics are not furnished. The people of the town occasionally l services there on Sunday afternoons. A few papers are n them by officials and some sent in by friends or others. re is a hose to attach to water supply in case of fire. Lamps kerosene oil are used for lighting.

o register is kept of inmates as to their habits, cause of dedence, mental condition, &c. The sick are treated in their s, and nursed by other inmates, as there is no hospital. No nesses have been detained the past year.

risoners are allowed to smoke and make ablutions in their s. I remember, with pain, a visit I made to a prisoner, a couple ears since, who was confined for official malfeasance, and whose was ventilated so badly that the foul air from tobacco smoke his own rebreathing made it impossible for me to endure it n for a few moments. He was suffering from palpitation of heart and decided anemia, and gave a vivid description of ptoms plainly due to a vitiated atmosphere.

f prisoners are taken sick at night they have to knock and

call keepers. Prisoners are fed at a common table, and cells h iron bedsteads. Very little sickness occurs here. Outside main jail, but in the building, is a cell containing, possibly, thousand cubic feet of air space. I was informed it was tomary, formerly, to confine tramps in this cell, and freque they were packed in until they were crowded. This, with any means of ventilation except through a grated door, r have made it a veritable "Black Hole." The building is he by steam.

MORRIS COUNTY JAIL.

This is situated in Morristown, and, as at Belvidere, is a of the court house. It is built on soil of drift formation and structed of brick and stone.

The walls are finished by plastering on the brick or st iron bedsteads are used. The cells open on an airy court, lighted. So long as the jail is kept clean, a pure, natural v lation is such that a sufficient change of air is had. The jai ceives its water from the city pipes. As in the previous the sewerage system in vogue in Morristown, is by cess-pool large pool is situated just back of the jail and covered plank and soil. The keeper has had considerable experien prisons and understands the virtue of good house-keeping, the general air of the jail was good. There is a water-clos the back part of the jail, and he only allows the excretio the body to go in this. Slops from bath tubs, &c., run in gutters, and after emptying slops he flushes the gu thoroughly with water, so as to cleanse them of all traces of water.

The water-closet contains a trap but in spite of this foul are sometimes forced back through the trap into the jail. keeper recognized the cause of this, and for this reason run slops in the gutter so as not to fill the cess-pool so rapidly thus force the gas to pass through the trap for an escape they will have cess-pools they should certainly run a up to the top of the building as a ventilating pipe to it.

The health of the jail is reported excellent. The keeper that the only sickness is from tramps and those brought sick. In white-washing he insists on having the old scrape and new put on.

leating is by stoves. No regular dietary but a change is
m. Medicine is furnished by the county on physician's
scription. No system of employment for inmates except
ning up around; no tobacco furnished inmates. The
oners' moral and intellectual welfare is looked after by the
M. C. A. and ladies who supply them with pamphlets and
ers. No provision is made in case of fire. Lighting is by
ps. The sick are treated in their cells. Prisoners are allowed
moke but not to wash in cells. There is no chance for change
ir in cells but through doors, except in top tier of cells where
e is hole 4x4 opening in attic.
ne person was detained as witness during past year, but al-
d to go around the grounds. No record is kept as to their
its, cause of becoming criminals, &c. Excretions at night
eceived in chamber vessels.

SOMERSET COUNTY JAIL.

urt house and jail are situated in a large square in the town
merville. They are constructed of brick and stone. They
to accommodate a large number of prisoners. Water supply
well, for kitchen and drinking, and large tank at top of build-
for flushing sewer pipes. Sewage is conveyed by means of
e pipes to a brook about a half mile from building. Sewer
s are ventilated by pipes carried up to top of building.
ter closets, &c., have traps. Sewers have good fall. Slop
r is conveyed to a cesspool which leads to a gutter in the
t; this they aim to keep well disinfected. Building is heat-
y stoves. No light allowed in the jail. Oil is used in court
se and sheriff's apartments. No regular dietary, but a
nge is given as far as practicable. Medical attendance is
when called on, and medicines are procured at drug store
physician's prescriptions. No employment for inmates. No
acco is furnished inmates. No witnesses have been detained
past year. Excretions at night are received in ordinary
mber vessels. Prisoners are allowed to smoke and wash in
ir cells. Ventilation is only to be had by natural methods,
provision made for change of air. No record is kept as to
its, cause of becoming criminals, &c.

UNION COUNTY JAIL.

This is situated in Elizabeth city and is a part of the Co House. The building is of stone and brick. The jail for m is a large court yard with cells in the centre abutting each o This is, I may say, the common plan for jail and prison consti tion in this State. There is a bath room and water-closet in ner of jail. Warden keeps this thoroughly cleaned with li and it had a clean appearance and good smell. The water-cl arrangements seemed of approved pattern and effective worki Excreta pass into city sewers. These are not ventilated tween traps and sewers. There is also a water-closet in kitchen. Water supply is by city water and is brought on floors of the Court House. They also have a well which t have to use in very dry weather as the city water at such ti gets to smelling. The building is heated by steam. There i regular dietary for each day, and a change in diet is gi Prisoners are fed at a common table. The jail physician atte whenever called on, and medicine is procured at drug store his prescription. They report very little sickness and noth that appears to originate in bad sanitation of building. tobacco is furnished except to a few who work, and they g little smoking tobacco. Building is lighted by gas. In the m part the court is well lighted and natural ventilation has a chance and besides there are air flues in the walls of each c The female part is constructed on the same general princip but is so surrounded by buildings that a change of air is not easily brought about through windows and doors. The air this part on this account had a close smell.

Witnesses are detained in a room up stairs, but as this enta solitary confinement, they sometimes prefer to be put in wi the other prisoners where they have more company.

Buckets with covers are provided for cell use. Lime is kept these all the time, and they looked clean and pure. Prisone are not allowed to smoke or wash in cells. The sewerage on t male side empties in a cess-pool, and from this into the ci sewer. This has to be occasionally emptied, and should b permanently closed or frequently cleansed.

ESSEX COUNTY JAIL.

This is situated in the city of Newark, and, of course, they have to provide for a greater number and a different type of criminals than in agricultural districts. Essex county has a penitentiary, and as soon as the courts sentence them they are removed to this institution.

The general plan for arrangement of cells is the same here as in other jails, but much more extensive. Prisoners on their arrival are taken to a bath-room and given a bath. Bath-rooms and water-closets are kept clean and carefully inspected daily by the officials. Prisoners are required to do the cleaning of the jail. Whitewashing is repeated at frequent intervals.

The excreta are run into the city sewer, and the closets and sewers are kept well flushed. Separate apartments are had for detention of witnesses and for hospital accommodation. Heating is done by steam. Water supply from city pipes. Ventilation of cells by the usual method of air-flue between two cells and opening from each cell into the air-flue.

The principal sickness is from the tramp class or from those brought in sick. The warden appreciates the necessity of keeping everything clean and using plenty of lime and water to accomplish this purpose.

ESSEX COUNTY PENITENTIARY.

This is situated between Montclair and Caldwell. It was constructed in 1873–4, and receives the prisoners from the jail after their sentence, instead of sending them to the State institution. It is built of stone and stands against a gently sloping hill. On the top of the hill is the reservoir for reception, storing and distribution of water. The prisoners on arrival are received in a bath-room, and given a bath, and their height, weight and appearance taken. Their clothing is done up in a package and marked so that they can have it when they leave the prison. A prison suit is given them of striped clothing; underclothing is given them every two weeks; shirt, socks and towel every week. Coats, pants and shoes are repaired when needing it. Each cell contains wash basin and water closet, with free water supply, for flushing pipes. Besides this there is a bath-room in the prison for the use of the prisoners. Sewerage is disposed of by the

Waring method, and the receiving cess-pools are a couple hundred yards from the building. The sewers are ventilated by pipes leading up to the top of the building.

Water is supplied by large well and by springs, pumped from them into distributing reservoir. They have plenty of water for all purposes, but during the recent dry weather, when the whole country was short or water, they were forced to be economical with theirs. The physician in charge says that at no time have they had, apparently, any sewage gases entering the cells, unless it was when the water supply was low. He thought that the lack of plenty of water made itself felt by a close smelling air in the cells. This is important as showing the importance of plenty of water with the best sewerage system. The sewage formerly ran into a main pipe and then emptied in a creek at some distance from the building.

The doctor states that he found organic matter in the water of the creek, some distance below where the sewage emptied into it. When that system was in vogue, though they had no low diseases, yet he found a lower vitality among prisoners, showing itself by opthalmia trouble, &c; this has disappeared since the present system has been inaugurated.

The building is heated by steam, and cells are ventilated by the usual method. There is a hospital for sick, with ventilation openings in the floor, but no openings at top of buildings. A regular diet list is had for each day and they aim to provide a change. Medical attendance is arranged for by daily visits from the appointed physician. Medicines are furnished by the county and drugs are kept on hand, and room is provided in the building for them.

Deaths last year were three in number; one dropsy, one heart disease, and one brought there with typhoid fever died in two days.

Prisoners are kept busy at quarrying and breaking stone. The warden informs me that they almost invariably gain weight. The building is new, and if our present system of caring for criminals is the proper one, it certainly comes as near being the model institution as it can well be made. We can easily see that they should gain weight. With wholesome food and plenty of exercise, they can hardly help but be in good physical condition.

No tobacco is furnished to prisoners. A library is provided for their use, and religious service is held on Sunday. No register is kept as to habits, cause of committing crime, etc. Plenty of sunlight can enter the halls, and of course shine in cells. Night watchmen parade the halls, and if prisoners are suddenly taken ill, they can call the watchman.

AIR SUPPLY AND VENTILATION OF THE VARIOUS JAILS.

The air space of cells ranges from four hundred to five hundred cubic feet of air space for each prisoner in the various prisons visited by me. This is increased by the doors being of grating, and by opening on large halls. Ventilation of cells, when provided for at all, is by flues between cells, and carried to top of building. In many of these a lighted taper failed to show any current of air. As these flues are always small, and as these buildings are usually heated with steam, a current of air could be easily provided by carrying a steam pipe into the flue, and thus providing for a current of warm air continually.

Examination of air was had in nearly all institutions. The lime water test showed no impurities, but I have tested in cells that had a foul smell, and yet found no change, indicating that there are other impurities of the air than respiration.

CAUSE OF CRIME.

Any statistics that I was able to gather, concerning this important subject, were necessarily imperfect this year. No inquiry is made by officials into this, when prisoners are received by them. All keepers agreed, however, that intemperance is, of all things, the most fruitful cause of crimes. This is not strange, when we think of its well-known power of lowering the moral sentiments, and elevating the passions unduly. Undoubtedly the majority of these persons are born with selfish propensities over developed, and with limited ideas of their moral responsibility. This is not improved by their education. In the opinion of the writer, inheritance and intemperance should be considered together, for these persons are, as it were, on a pivot, liable to go either way. If they observe temperate habits, are steady and frugal, they will pass through the world as honest men and women; but if their education has been such as will

develop the passions, and create habits of intemperance, they will take the other side, and become criminals. They are evenly balanced when sober, but when stimulated with alcoholics, their moral sensibilities are loosened, and they easily slide over to wrong-doing, and thus commit many crimes against society.

In this manner alcoholics act as the exciting cause. The fact that they inherit low ideas of their moral responsibilities is the deeper cause. Thus alcoholics become the exciting cause of from seventy to eighty per cent. of all crime committed. I do not think this is putting it too high. One warden said that ninety per cent. of the criminals was made, so he felt sure, by alcoholics; he made this estimate after years of experience with this class. His experience here had been mainly with short commitments, such as occur in county jails, but he had been a keeper in a penitentiary and thought that this same percentage would apply there.

The deputy warden of the Essex County Penitentiary, who has been connected with that institution since it was built, and, prior to that, with the penitentiary on Blackwell's Island, N. Y., put the percentage much lower, but thinks alcohol is a fruitful source of crime. But this evident cause of criminals is worthy of the closest study by statesmen and legislators.

As to inheritance, though many criminals are such from birth, following the same line of criminality that their parents did, yet the masses of criminals, we doubt not, are recruited from the lower social classes.

Children born in tenement houses and educated in the gutters will have little inherited idea of right or wrong, and their education will drive out what little moral sensibility there is remaining. What can we expect but that these children will become criminals and dependents?

The writer could find but few facts regarding race. Intemperance, inheritance and education are the main factors to be considered in reference to diminishing the criminal classes. Regarding the latter, I do not think that mere intellectual education is all that is necessary by any means.

Unfortunately, society has not yet reached the point at which it is agreed as to the proper manner of cultivating the moral qualities, but it is just as much the duty of the State to do this

as it is to educate the intellect, and to do it for self-preservation. At the same time their physical nature should be looked after.

The work of the State Board of Health here makes itself felt. The better instruction of the people in sanitary laws, and self-care will, I doubt not, be shown in a few years in lessening the proportion of the criminal classes. The proper education of the child is to give it an "all round "education. While we are looking after its intellectual and moral education, its physical should be looked after as well.

Therefore, it is the duty of the State to provide for the education of its children into the laws of their physical being. After the care of self and after reading and writing, the first thing taught should be physiology and hygiene. This may seem sentimental and ahead of the times, but that it would lessen criminals, I feel sure.

In the prisons visited by me I think I always saw evidence, on the part of the officials, of diligent effort to keep their charges in good sanitary condition. There might be some improvements made in all the prisons visited, in some sanitary details, and in the construction of buildings; but in all there was good housekeeping, and the absence of disease spoke well for their sanitary condition. The officials of the Essex County Penitentiary should be commended for their prompt change in sewage disposal, when they found that the original plan was inefficient. Unfortunately committees and other governing boards are not always so prompt in making needed changes, for fear of losing votes at the ensuing election.

If the present plan of confinement and punishment is the proper method for caring for criminals, then I have but few suggestions to make. A plentiful supply of water and lime and good food will make up for many deficiencies of modern sanitary appliances. Of course such a condition of sewage pipes as exists at the Warren and Morris county jails should be at once remedied (where sewage passes into tight cesspools and these as well as pipes not ventilated) but this is the fault of jail committees and not of the jailers. It may be that all of our care of criminals is defective. While it cares for them and punishes them, yet it might be well to inaugurate a method having more reference to the cure of their social condition and the prevention

of crime in the future. That this will be the method of the future we do not doubt. The education of the youth properly belongs to the public instructor, but after they leave his care, it might be well to have some system of visitation that would look after young persons who are committed for the first time for some light offense, as drunkenness, vagrancy, assault and battery and petty thieving.

The plan I suggest would also look after the discharged prisoners, seek for them employment and help to make them respectable citizens and to forget their past life so far as possible. The medical profession is recognizing the great importance of preventing disease in order to prevent crime, and are studying side by side these great social problems, which have for their aim the physical, moral and industrial elevation of the masses.

ALMS-HOUSES.

In country districts these buildings are often situated some distance from towns, and are, therefore, not subject to the frequent inspections that jails receive. Among many officials there seems to be almost an opinion that anything is good enough for the pauper. This is not true, according to my experience, of the official having direct charge of those people, but it is true of the governing boards in many instances. The sanitary condition of alms-houses will not compare at all favorably with the jails. The latter are far better constructed and better provided with sanitary appliances than the poor-houses.

WARREN COUNTY POOR-HOUSE.

This is situated on the road leading from Hackettstown and Port Murray to Belvidere. There is a large farm, which is worked by pauper labor principally. The building is old, having been built many years ago. Some one hundred feet from the main building there is a two-story building of more recent construction, which serves as dormitory for some of the men.

The inmates in the summer get reduced to less than ninety. In the winter they are added to until over one hundred and

twenty have to be accommodated. It will accommodate eighty or ninety inmates quite comfortably, but as built and arranged it is not adapted to hold over seventy-five. In a letter to the Washington *Star*, of January 23d, 1880, I made a detailed report on the sanitary condition of the house. At that time there was one hundred and thirteen inmates. This made less than three hundred cubic feet of air space for each inmate. No provision is made for ventilating rooms other than by valves over the doors. These are sadly insufficient for the purpose. In addition to its overcrowded condition, the building is heated by stoves, and not only is the air consumed by the inmates, but by the stoves. These are cared for by inmates, and the amount of coal gas thrown out generally by each of the stoves is fearful to contemplate. I give the dimensions of one room, on the men's side, of the foul condition of which I have a vivid remembrance:

It is room No. 2 containing nineteen hundred and seventy-five cubic feet of air space. One stove, two windows, one door, six inmates, three hundred and twenty-nine cubic feet air space per inmate. Very close. Nine thousand and fifty-four (9054) respiratory impurity per one thousand volumes. This room is invariably foul. It is used during the day as a sitting room and smoking room, and usually in cold weather there are ten or twelve sitting in it, making less than two hundred cubic feet of air space per inmate during the day. There are here a couple of old men chiefly confined in their beds. I have noted the fact that these inmates complain more during cold weather than during warm, when they can be out. The stove here gives off great quantities of carbonic oxide, which decidedly helps to make the room unbearable to those used to pure air."

I was the attending physician for two years. In the winter time, when doors and windows were closed, I could not stand it in this room at all; it could only be appreciated on being inhaled. The truth is that the ventilation of the whole building is as bad as it well can be, and in the winter months it is much overcrowded. The mortality to children was great during my attendance. In case of sickness in adults or children, the vitality would be so much lowered, and this, combined with foul air, made it almost impossible to rally them. The Steward was par-

ticular in keeping the house well cleansed and whitewashed, and this, I believe, prevents an outbreak of septic disease.

The water-supply is by a spring, about seventy-five or one hundred feet north of main building this is lower than basement of building a few feet further on, and on six or eight feet higher ground, is situated the privy. On first glance, this would seem criminally close and in just the position to contaminate the spring; practically, however, this seems never to have occurred, and the lay of the ground would seem to carry all drainage in a direction from the spring. Recently, the authorities have brought the water from the spring down into the house, and it is hoped they will soon distribute it through the house.

The present management have arranged the privy so as to remove its contents and spread on the soil every few weeks or months. Still the chances for contamination of spring remain, for it is difficult to tell how many crevices may be in the rock and what direction they may take. This privy vault may have contaminated the soil for many feet around. A large spring against the hill, a quarter of a mile from the house, could be easily conveyed to and through the house.

Slop-water from the kitchen is thrown into drains in front of each kitchen door. The soil is of gravel drift, and the drain leads some distance down the hill and empties itself into the soil. This provides quite efficient disposal of kitchen waste by irrigation. Excreta is emptied in a privy vault, from which it is spread on fields. Ordinary chamber vessels are in use for the night time and for the sick. The need of more space, better ventilation and more water-supply is sadly felt.

The children are sent to school at the public school about a mile distant. Places are found for them as fast as possible. The arrangement of the building and its overcrowded condition make it impossible to separate the sexes entirely. Every effort possible is made to keep them apart, but they succeed in getting together at times. I clip from my letter in the *Star* the following, which tells its own story:

DEATHS.

Deaths from June, 1878, to January, 1880.....	16
Those having one or both parents paupers.....	6
Percentage of those dying having pauper parents.....	37.5

BIRTHS.

Number of births from June 1, 1878, to January 1, 1880..	6
" " conceived in the house.....	3
(These conceptions took place prior to present management.)	
Percentage of births that were conceived in the house.....	50
Percentage with Irish parents.....	66.6
Percentage of illegitimate.....	16.66

(The small number makes the above of but little practical value.)

STATISTICS OF WHOLE NUMBER IN THE HOUSE.

At present in the house.....	113
Conceived and born there.....	8
Born there.....	16
Having pauper parents, one or both.....	32
Foreign born—Ireland, 25; Scotland, 2; England, 2; Germany, 5.....	34
Native born.....	79
Percentage of inmates conceived and born in the house...	7.07
Percentage of inmates born there.....	14.15
Percentage having pauper parents, one or both.....	28.31
Percentage foreign born.....	30.08
Percentage native born	69.91

STATISTICS OF ADULTS IN THE HOUSE.

Adults in the house.....	84
Adults conceived and born there.....	2
(In addition to this there are a number of doubtful cases.)	
Adults having pauper parents, one or both.....	6
(All the foreign born deny it, as a matter of course.)	
Percentage conceived and born there.....	2.38
Percentage having pauper parents.....	7.14
Percentage to whole number in the house.....	74.33

STATISTICS OF CHILDREN IN THE HOUSE.

Number of children in the house.....	29
Number of children born there.....	14
Number of children having pauper parents, one or both,	26
Number whose parents are both there now.....	11

Number of children conceived there	6
Number of children of illegitimate birth	12
Percentage of children to whole number of inmates	25.66
Percentage of children conceived there	20.68
Percentage of children born	48.27
Percentage of children that had pauper parents, one or both	89.65
Percentage of children that are illegitimate	41.37

MORRIS COUNTY POOR-HOUSE.

This is situated two or three miles from Boonton, and the county owns there a farm of two hundred and forty acres. Building is of wood, and the main part is old, and though in good condition outwardly, the walls and floors are poor.

There is a new building, perhaps seventy-five feet from the main building, and this serves as a dormitory for men. There is provided from five hundred to six hundred cubic feet of air space per inmate; no arrangements are made for change of air other than by openings over doors and through windows and holes in ceiling opening in attic. The air of the new part seemed pure, but in the old or main building it was close and had a bad smell. Air, however, on my visit showed no excess of carbonic acid gas. Rooms are frequently and thoroughly whitewashed, but in spite of this the general air is bad, indicating that a thorough remodelling of the building is necessary. Kitchen slops empty in pipes leading to a creek, possibly two hundred feet distant. Privies, with vaults under them, receive the excreta; these are emptied every few months. No indoor water-closets are provided; chamber vessels are used for night use. There are a couple of closets in the house in which buckets are kept for use of inmates, and these they are required to remove daily and cleanse.

The old building had originally vaults under one side of it so that each room on one floor of that wing had a privy adjoining it. This became so great a nuisance that these vaults were filled in some years ago and the lids of the privy holes screwed down. Water is supplied from four wells; in the wash-room of the new building water is led in by pipe from a reservoir.

Iron bedsteads are used. A portable bath-tub is in use for inmates. They are fed at a common table. Cellars are under

nearly the whole building. Some difficulty has been experienced in keeping meat in one of the cellars. Water does not come in the cellars and they were clean and well aired.

Three ward-rooms have fire places. Heating is done by steam. No regular diet list is had, but a change is provided. There are five insane paupers and eleven demented or foolish. All are considered harmless, and they are not kept separate, but the Steward thinks they should be. Male and female are locked in separate apartments at night, but mingle freely together during the day. Steward believes this should be different, and that they should be kept separate at all times; but he could not well do this in the present building. With the exception of having more space, this institution is not near so well arranged as the Warren County Poor-house.

The children are taught by a pauper in the building, and they are bound out as soon as places can be had. The attending physician states that they have had "no diseases for many years directly traceable to sanitary defects."

Inmates are required to work on farm and garden when able. Tobacco is furnished to about thirty. Kerosene lamps are used for lighting. No register is kept as to habits, cause of dependence, mental condition, &c.

ELIZABETH CITY POOR-HOUSE.

This is situated on the border of the salt meadows, just out of Elizabeth city limits. It is built of stone and brick walls are hard finished.

Most of the children are vaccinated, but it is not seen that they are vaccinated when they are brought in. Iron bedsteads are in use. Bath-rooms are provided for inmates. Sewage runs in pipes and empties about two hundred feet from building, on the salt meadows. Buckets are in use in case of sickness.

Privies are in use out of doors, and excreta drops in vaults. These are cleaned every winter, but not ventilated. Water-supply is by well and cistern. Heating is by steam.

The average number last year was forty. There are three insane paupers. An inmate's arm was broken a couple of years since, by an insane pauper. As far as possible, the sexes are kept separate. Medicines are kept in the house, and a phy-

sician visits them every two days. Tobacco is furnished to those that use it.

No arrangements are made for schooling children. As soon as old enough they are put in the various asylums. Kerosene oil is used for lighting. No register is kept as to habits, course of dependence, &c. Over one-half are foreign born.

Heating is by hot-air furnaces, and ventilation is through windows and doors. The house, at time of my visit, was certainly not crowded, and air of apartments was pure, so far as sense of smell was concerned.

Paupers are required to work on the farm and garden when able. The institution is reported healthy.

ESSEX COUNTY POOR-HOUSES.—NEWARK CITY ALMS-HOUSE.

This is situated on the Elizabeth avenue and adjoining the salt meadows, and at extreme end of city. Buildings are owned by city, and are built on sand and gravel drift. City has here about thirteen acres of ground, which are used for most part for trucking. Building is constructed of brick; originally erected about 1840, and rebuilt and enlarged 1868. All children are vaccinated. Iron bedsteads are in use.

Inmates, on their arrival, are given a bath, and their clothing is boiled and pickled in alum and hot water to destroy the vermin. The steward says that he had great trouble to keep vermin out for a while, but they stopped the rolling up of old clothes and putting them under the pillows, a custom very common with this class; since that time, by observing strict cleanliness, there has been little trouble with vermin. Every inmate is required to take one bath every week. Inmates are fed at common table.

All sewage runs in city sewers; all openings are well trapped. There was formerly a large vault under the centre of the building, and water-closets over it. There was a well about sixty feet from vault, and a gradual slope from vault to well. The present management had this vault carefully cleaned and filled in with dry earth. This was five years ago, and at that time the well-water had bad taste and there was a smell from privies through the house. Then was inaugurated the system of sewerage now used, which remedied the evil. The Steward and Governing Board has aimed to have all sewer openings well trapped. Sew-

ers are ventilated only by openings where surface water runs in, and are ventilated also by tin pipes carrying roof washings in the sewer.

The average number the past five years (since present management came in) has been about the same.

Death rate in 1875 was at the rate of 78 per thousand.

Death rate in 1876 was at the rate of 54 per thousand.

(This was after vault was cleaned and sewer put in.)

Death rate in 1877 was at the rate of 48 per thousand.

Death rate in 1878 was at the rate of 28 per thousand.

Death rate in 1879 was at the rate of 23 per thousand.

The Steward attributes this (and I think correctly) to the improved sanitary condition of the house. During this term the yearly average was about two hundred. This being the case, we find a reduction in the death rate of the house from thirty-nine per cent. to eleven and five-tenths per cent. Certainly this reduction is worthy the study of some poor-house officials, who think sanitary authorities are visionary when advocating improved sanitary measures. I think the above figures tell their own story, and that the moral is plain. Ventilation is by fanlights over doors, and halls have ventilating opening through ceiling, and ventilators on roof. At my visit I found the air of rooms good, and they were not in a crowded condition.

The water-supply is from city water-works; there is a receiving cistern in the attic. There is also a well which is used some for cooking purposes. The city water can be used by using from storing tank in the attic or directly from city main. Steam is used for heating purposes.

A change of diet is provided and fish is given on Fridays. A number of harmless imbeciles are kept here, and the Superintendent thinks it not essential to keep them separate.

Sexes are kept in separate apartments, and while out of doors a high board fence separates them. Nursing of the sick is by inmates. Medical attendance four or five times weekly, and oftener if necessary. Medicines are furnished by the city on requisition of alms-house physician. Officials complain that the alms-house is made the receptacle of nearly all the incurable poor from their hospitals.

The need of Newark seems to be a city hospital for the poor. No hospital is provided in alms-house, but a room is provided

as lying-in room for women. Inmates are required to work on the farm, trucking, &c. A few have tobacco furnished them. Children are sent to public school near by, and they are apprenticed out when places can be had. About twenty were born in the house last year.

Oil is used for lighting purposes. No register is kept as to habits, cause of dependence, mental condition, &c. Although there are many errors in construction of building, &c., yet this institution is, in its general condition, far superior to the average poor-house.

Franklin township, Essex county, supports its poor at the Belleville poor-house, but the greater portion of its poor is given out-door relief by its Overseer of the Poor. They have but one in Belleville poor-house, for which they pay two dollars per week. Overseer said he had about thirty to whom he was giving relief. Of twenty out of these thirty, the cause of their dependence was either directly or indirectly to be found in alcoholic drink.

Belleville township has a poor-house. Overseer of Poor has control of it, and lives about one-quarter of a mile from it. It had seven inmates on my visit, and the overseer furnishes food and fuel and other necessaries, and they keep boarding-house for themselves. The overseer has been the same for very many years. Says house has usually been healthy since the typhoid fever prevailed, twenty years ago. Most of sickness is brought there. Children are bound out as soon as proper homes can be found. Of the seven in the house, four were Irish born, two American and one English. The overseer thinks debauchery and dissipation the most frequent cause of pauperism, and says he estimates eighty per cent. of paupers are made so by drink.

Bloomfield township has an alms-house, but they aim to help, by out-door relief, as far as possible. At my visit the house was closed and I did not inspect it.

Montclair gives out-door relief, and has poor-house which has an average of ten inmates. It is under the control of the Overseer of the Poor. The building is on a lot, or small farm, and is like many cheap farm-houses; everything about the house was neat and clean, and while here, I felt strengthened in my belief that to scatter the poor, and each township to care for its own in

small buildings, is, after all, the better way for agricultural districts.

Inmates here are not allowed to leave the premises. The overseer thinks this works well, as they do not like the confinement and are apt to seek work.

They have a room set apart for the sick, and this contains an earth commode. There is an out-house for lodging tramps where they are put without pipe, tobacco or matches, and they are given but little to eat.

GENERAL REMARKS.

To my question asked Superintendents and Overseer, "What do you consider the most fruitful cause of pauperism?" the reply *always* came without hesitation, "Drink." This was estimated as the cause of from sixty per cent. to seventy per cent. of pauperism. Taking the opinion of all the men having charge of alms-houses, jails, and out-door relief and with whom I came in contact, I am safe in saying that at least eighty per cent. of crime and pauperism, is due to alcohol. The Steward of the poor-house, at Elizabeth, gave me a case to the point: A man with wife and four or five children, a workman in Singer's Sewing Machine Manufactory, able to earn thirty dollars per week, became so dissipated that at last himself and family became inmates of the poor-house. Although not a member of any teetotal organization we are forced to admit that *alcohol is the cause of by far the greater proportion of crime and pauperism.* It has a more direct relation with pauperism, than with crime. In men of bright intellects, alcoholics elevate the passions and debase the moral sentiments, and crime is the result. In the lower ranks and among men of low intellects, though it has the same action, yet they do not become criminals, but all shame and sense of degradation is lost in the desire for drink, and they become paupers. The aim of alms-houses seem to be to give a home to the unfortunates who are forced by reverses to become dependent on charity.

In reality, they are the home for the low debauched. Race becomes more prominent when we consider pauperism than in considering criminals. Inheritance undoubtedly plays an important part in the production of pauperism. A year ago, in the Warren County Poor-house, I found over twenty-eight per cent.

had pauper parents. (See figures above.) I believe the proportion will fairly hold out over the State. Venereal diseases have been quoted as a cause of pauperism, but I am inclined to consider them the result rather than the cause of pauperism.

So far as my inspection is a criterion then, it shows that the system for indoor relief in this State is to care for those becoming dependent, and has no reference to present or future prevention. This seems a vital error. Full statistics should be kept so that accurate knowledge could be had as to habits, cause of dependence and mental condition. As to sanitary condition, without doubt, they are, upon the whole, bad. The only reason that septic diseases are so few, is, no doubt, due to the cleanliness and strict oversight of the Superintendent.

In the city of Newark, the Overseers of the Poor have full charge of out-door relief; they make visits and inquiries before extending relief, give coal, bread tickets, and a little cash. Overseer thinks this much better than orders on groceries and market. The careful oversight of Overseer seems to have materially lessened cost of out-door relief. Economical out-door relief, with some provisions for in-door relief, seems to be in accordance with the most enlightened views on the subject of pauper relief. The buildings for reception of paupers in counties visited by me, are arranged with little reference to the needs of such institutions. The writer favors the cottage or pavilion plan, but the model poor-house is not in these counties.

A question of vital interest is the tramp question. I was agreeably surprised to find a unanimous opinion among officials that something should be done to lessen the amount of crime and pauperism. The matter is worthy of the closest scrutiny by legislators.

With carefully-collected statistics, and with popular opinion aroused, this State could revise its poor laws, and in other ways do much to not only better the condition of the paupers and criminals, but what is far more important just now, do a great deal to lessen these social disabilities. In some of the public institutions improvements could be readily and economically made in sanitary measures, but for the most part the governing boards of these institutions are little acquainted with sanitary laws, and these are made secondary to other considerations.

The many thousands spent for poor relief in this State, should

be lessened in some way. A very large proportion of our pauper population is of foreign birth. Some measures taken by our National Government to limit this class of emigration would no doubt benefit the tax-payer.

The measures taken to diminish crime and pauperism go together. The care of insane paupers by the counties themselves, instead of caring for them at the State institutions, is at tracting considerable attention. I frequently had the lessened cost to Essex county quoted to me and visited the Insane Asylum at Newark. If other counties will provide equally good accommodations and supervision, I should advocate the scattering of our pauper insane, but to take them from the comforts of a well-regulated State Asylum to some of our poor-houses would be actual cruelty. Many forget that the needs of Essex county, with a large city and its populous suburbs, are different than the needs of an agricultural county like Morris and Warren.

What has already been said regarding education, when treating of the criminal classes, will apply as well to to the pauper classes. Though our overcrowded poor-houses should be relieved, and many changes made in their sanitary arrangement, as well as in that of the jails, yet I feel assured, the really imporant thing for public spirited citizens of our State to consider, is more enlightened methods for the care of these classes that their numbers may be diminished, and that those once discharged may not again become criminals or paupers.

In conclusion, I should like to express my thanks to all the officials with whom I have met. I was treated with uniform kindness, and not only allowed to make inspection, but had extended to me valuable assistance in many of them, while closely following existing methods, yet express themselves defective. If, at any time, it should be deemed advisable to gather more accurate statistics regarding this vital subject, none will more heartily concur than these officials, many of whom will be able to give valuable hints.

The jail of Middlesex county was examined by the Secretary of the Board and found in good condition, with a few minor exceptions.

The description of Warren county Alms-house well applies to that of Camden county, which will be noticed in the next report.

LOCAL HEALTH BOARDS.

WHAT THEY CAN ACCOMPLISH IN THE INTEREST OF PUBLIC AND PRIVATE HYGIENE AND SANITATION.

BY H. A. HOPPER, M. D., HACKENSACK.

If the diffusion of knowledge pertaining to private, and through it to public health, be the lever by which communities can be moved in the direction necessary to secure their present and prospective comfort, it becomes plain that the domain of the local health board is not alone the correction of existing evils, but the use of all legitimate means within reach to inculcate the the truth that *preventable* diseases cause a large share of the discomforts and sufferings of the human race. As sanitary science progresses and opens up new fields for investigation year after year, new demands are continually being made for the development and utilization of the best methods to be employed, in the application of newly discovered scientific laws, to the daily requirements of domestic and public life. Health Boards are at present the recognized instruments for the emergencies of the situation.

It may be safely said, what the unit is with its fellow in the statement and solution of a mathematical problem, so also is the relation of a properly organized Local Board of Health to the value and efficiency of both State and National Boards, in the collection of data for the intelligent and satisfactory enforcement of all sanitary regulations within their jurisdiction. It is a self-evident proposition, that all circumscribed areas of human habitations have their especial wants, which are best understood by the intelligent observer, whose constant association with a particular population and their habits of social and domestic life, and whose knowledge of topographical and prevalent meteorolog-

ical influences enables him to estimate the especial needs in such localities. Special commissions of investigation must frequently fail of accomplishing the object of their creation, where either ignorance or indifference and often the opposition of prejudice withhold needed information, or interpose obstructions to the pleasant working of public machinery. The value and importance of a Local Health Board cannot be over-estimated if the true spirit and object of its work be appreciated, both in relation to home improvements and the collection and summarizing of correct data for the annual report of the State Board. To render such service in keeping with its importance, the Local Board must at its earliest opportunity, push forward the work of making a sanitary map, by actual survey of the territory within its jurisdiction, defining the topography, including sub-soil advantages for draining, together with notations of changes which have been made, or which should be made, by the filling in and obliteration of water-courses, suggestive of the requirements not yet met, and in all matters to study and define the specific demands of such locality, growing out of the sanitary relations of the population to the soil covered, and to be covered, by their habitations. Social and domestic habits can be pretty effectually learned without intruding, offensively, upon individual rights. Exposures of unsanitary conditions connected with the dwelling are so frequently spontaneous, that they make their own suggestions. A surface house drain reveals itself by projecting its waste beyond the house enclosure, and by its offensiveness calls for the attention of the Health Board. The neglected cesspool and privy vault regale the nostrils, and cry out for relief. Many other tacit exposures of domestic indifference and carelessness, attest the value of corrective supervision. The duty and work of the Local Health Board appears plainly to be first to learn the necessities of the population which dwells within its jurisdiction, and then to devise the most prudent, as well as the best means to meet such necessities; but in the exercise of authority, to make it successful, rather by the force of sanitary education, than by the exhibition of imperious power; always tempering the corrective with something of the "*argumentum ad hominum*," persuading by appeals to selfish impulses, if need be, including the argument for the protection of self and home, that private interests may be made subservient to the public weal.

en recourse must be had to legislative power, in the event of r failures, let the broadest construction and application be e without reserve.

he foregoing treatment of the subject is rather a generaliza- of its importance than a detail of the practical work which uggests. For example, the importance of a private system rainage for every home must be insisted on, and when hesi- y or delay retards the necessary improvements, the local d must point out the necessity and establish a system appli- e to individual cases, without regard to special locality. danger of allowing garbage or wash waste from houses to hrown carelessly on the surface, or to be conducted into a ly-constructed cesspool, must be met by instruction, or by nance compelling the abandonment of the one and the truction of both cesspools and privy vaults with water-tight oms and side walls, to avert the danger of well-water pollu- ; and so to apply a system of pipe ventilation that atmos- ric poisoning may be prevented inside of dwellings.

nother subject imperatively within the province of the local d, is the important one of particular supervision of public dings, both as it relates to the method of conducting sewage ter from such buildings, the mode of heating, and the appli- on of the best-known methods of ventilation to all the tments of those structures.

this category must be placed court rooms and jails, when are within the limits of control of the board. Hotels for accommodation of boarders, churches and public assembly ns of any kind, and notably school buildings, which are not e passed over with an inspection as to general plan, but ld include the detail of examining class-rooms, in relation entilation, as it may be applied to the requirements of an rage number of pupils occupying such rooms during school rs. From the local board should emanate suggestions to cipal and teachers for the detection and stamping out of tagious and infectious diseases when they make their appear- e in the school. Where vaccination has been neglected, no er opportunity for the discovery can be found than by the -call from the teacher's desk. The application of our State s, as provided for in such cases, becomes a comparatively matter by such supervision.

Verbal advice, judiciously given by an authorized committee from the local Board, will accomplish great things by challenging attention to the constant neglect of the plainest, as well as the most intricate laws of public and private health, but in addition to this, recourse should be had to the local press whenever the columns of a newspaper can be employed, to reach a larger number by the discussion of subjects pertaining to the sanitary needs of your people. At stated periods printed circulars should be distributed, containing health ordinances for the guidance of all concerned in the promotion of the best sanitary interests of the community, both general and special.

Appended is a specimen of the plan, indicated in the above consideration, which has been found to work admirably under the direction of the Board of Health of New Barbadoes township, especially in its application to the town of Hackensack, N. J., where, in the period of six months, neighbors who were for a long period of years indifferent to each other's surroundings, have become vigilant advisers for their mutual benefit.

CIRCULAR OF THE BOARD OF HEALTH OF NEW BARBADOES TOWNSHIP.

At the last session of our Legislature, particular attention was given to the pressing wants of the people of the State, looking forward to a more perfect system of sanitation for both town and country. Laws were enacted for the compulsory organization of a Board of Health in every township in the State.

Under the provisions of the laws alluded to the township of New Barbadoes has organized our Board of Health, and we now appeal to the people of the township for your co-operation in carrying forward a work which is in every way calculated to secure a better and more permanent condition of the public health.

At the outset we are thoroughly impressed with the importance of the truth that a proper education of our people in sanitary matters lies at the foundation of a successful enforcement of that system of individual restraints which is the great factor in making up the sum of community profits from a well-regulated public hygiene.

So many sources of atmospheric and water pollution exist in ·ery community unheeded, that familiarity with their presence ›gets an indifference to the fact that, every week and month of ıe year, such sources of danger to health and life are multiply-ıg; and unhappily the force of this truth is often realized only hen some devastating pestilence numbers its victims by dozens, ıd sends distress and mourning into as many households.

As the preventive is always more satisfactory than the remedy, e desire to call your attention to some of the more common ıd unsuspected causes of bad health, and advise their imme-iate removal by individual effort, in order that the powers ›nferred by law may not be required for coercion by the Board ' Health:

Outside of dwellings, badly constructed and much neglected ssspools and privy vaults pour out the poisonous gases of ·ganic decomposition to vitiate the atmosphere you breathe in ›ur houses, while through their uncemented bottoms streams ' corruption percolate the soil and find the outlet for their pol-ıting matter—held in solution or suspension—in wells which ıpply families with water for drinking and cooking.

As the season is advancing and summer will soon follow ›ring with increasing high temperature, when putrefactive ecomposition of waste matter is certain to be rapidly increased, is the part of wisdom to begin at once our efforts for the re-ıoval from our houses of every source of such contamination.

We call your attention to some advice given by our State oard of Health in the following paragraph:

"Look to the condition of your house. Begin at the cellar or asement. Have nothing there that can decay or that causes ›ul odors. If damp, let in air or sunlight; or drain the sur-›undings if needed. If by cleansing by whitewash, or by repeated ring, there is not agreeable air, speedily use some disinfectants. ook to the kitchen; let all sinks be kept sweet by scrubbing, by ot water poured down every day or by the free use of disinfect-nts when needed."

Be sure that the sink is properly trapped and that a ventilat-ıg pipe is carried from the waste pipe of the same size, to the ›p of the building and above it.

Have the dwelling and sleeping rooms well aired every day; ıake up the bed clothes freely every morning after sleeping in

them, and air them well by windows widely opened so that free ingress may be given to outside air, in order that organic particles, which would otherwise accumulate and cause atmospheric pollution, may be neutralized and driven out.

In your attention to the out-door arrangement of your home—see to it, first, that the privy vault and cesspool are not in too close proximity to your own or your neighbor's dwelling; second, that it is constructed with masonry, water-tight in both side walls and bottom; that filth accumulations may be thoroughly removed at stated periods—and pollution from such sources of your own and your neighbor's water-supply may be prevented.

Both of the filth receptacles just named should be supplied with ventilation high enough to avoid throwing offensive gases into your own or your neighbor's windows.

In all cases where new vaults are built, the old one must be thoroughly cleaned before being filled with earth. All these conditions will be strictly enforced in the future.

To avoid future complaints to, and attention from the Board of Health, it is suggested that immediately after the present cleansing, tight bottoms be made to all filth receptacles.

Any suggestions needed for sanitary management will be freely given by the Advisory Committee of the Board of Health. H. A. Hopper, A. S. D. Demarest, M. W. Heath.

A list of the best and cheapest disinfectants may be had at any time from the same source.

H. A. HOPPER, M. D.,
President and Medical Superintendent;
M. W. HEATH, *Vice President;*
H. H. ZABRISKIE, *Secretary;*
A. S. D. DEMAREST, *Treasurer;*
JOHN SCHMULTS,
Board of Health of New Barbadoes Township.

SECRETARY'S SUMMARY OF REPORTS

FROM LOCAL BOARDS OF HEALTH, WITH COMMENTS.

One hundred and eighty-seven formal reports have thus far been received by the State Board from local boards.

Twenty-six more report boards as formed, but they have had occasion to do so little that no special report was rendered. A few townships, understanding the law to be permissive and not compulsory, have failed to organize. It is believed that another year will witness the formation of boards in all townships and towns of the State. While in some there will be need of very little service, it is the right of every citizen to have thus a constituted authority to which to appeal in case of need. Besides the existence of such a board leads its members, as well as others, to be more inquisitive as to matters which concern the public health. This is sure to result in greater intelligence as to the avoidable causes of disease. No one could read the reports received, and some of them from very sparse districts, without recognizing that the subjects of inquiry are many, and that needs may arise for oversight in localities which seemed protected.

The form of schedule sent out was as follows:

ANNUAL REPORT

of the Local Board of Health of (city or township).....
County of.....for the year ending October 1st, 188

NAMES AND POST OFFICE ADDRESS OF MEMBERS.

.....

.....

SCHEDULE OF SUBJECTS FOR REPORT.

A. Location, population and climate.
B. Geology, topography and contour.
C. Water-supply.
D. Drainage and sewerage.
E. Streets and public grounds.
F. Houses and their tenancy.
G. Modes of lighting.
H. Refuse and excreta, (how managed.)
I. Markets.
J. Diseases of animals.
K. Slaughter-houses and abattoirs.
L. Manufactories and trades.
M. Schools and school and other public buildings.
N. Alms-house hospitals, and other charities.
O. Police and prisons.
P. Fire guards.
Q. Cemeteries and burial.
R. Public health laws and regulations.
S. Registration and vital statistics.
T. Quarantine or care over *contagious* diseases and vaccination.
U. Sanitary expenses.
V. Heat and ventilation for dwellings.
W. Health conditions of the year.

Other subjects may be named under X, Y, Z. The subjects may thus be referred to by the letters.

If the sheet provided is not sufficient, add others, marked with the letters which designate the topic treated.

A.

B.

This order has been carefully adhered to by most of the Boards, with much additional information in some of them as to present condition of health or local evils.

The amount of information returned was far greater that had been anticipated, and if printed in full would be of permanent value to the State.

On some of the subjects collateral to health interests, such as A, B, F, K, L, M, N, Q, etc., we have collected a body of definite information of much value in any statistical inquiry into matters of local conditions, prosperity and local development. On matters relating to the public health, the information is far more extensive, reliable and instructive than any heretofore collected. It is the purpose of the Board so to complete this as to make it accessible to citizens who would closely estimate the material desirability, development and healthfulness of the State.

We desire to make acknowledgements of indebtedness to all these Boards who have so fully and faithfully responded. It is impossible to publish all the material thus furnished. We shall only seek by a few specimen reports and by abstracts bearing on particular subjects to show how important is the full information thus secured.

The reports of Newark and New Brunswick will be given in full as specimens of valuable city reports. A few townships will be selected as models in the same way. From others we can only cull a few sentences, and pass many only because there is no specialty of condition or disease requiring our immediate notice. We ask careful attention to these brief notices, as many of them refer to valuable points in local needs or local experience, and so help all in the study of health matters.

After the full reports of Newark and New Brunswick, the rest will be given in the order of counties.

REPORT

OF THE BOARD OF HEALTH OF THE CITY OF NEWARK, NEW JERSEY, TO THE BOARD OF HEALTH OF THE STATE OF NEW JERSEY, FOR THE YEARS 1879 AND 1880, ENDING OCTOBER 1, 1880.

BY CHARLES M. ZEH, M. D.

In compliance with a request of the State Board of Health, the Health Board of the city of Newark, N. J., present the following

REPORT:

The Board of Health of this city is composed of the Mayor, who is President of the Board, the Health Physician and the members of the Committee on Public Health, of the Common Council.

The members of the city Board of Health for the present year are: William H. F. Fiedler, Mayor, who is their President; Isaac A. Nichols, M. D., Health Physician.

Alderman MARTIN B. PROVOST,
PIERSON G. DODD,
JOHN S. CLARK,
Committee on Public Health.

A.—LOCATION, POPULATION AND CLIMATE.

The City of Newark is situated on the west bank of the Passaic iver, about eight miles from the City of New York, in the county

of Essex. Its nothern boundary is the township of Belleville and one of the great flexures of the Passaic; on its west lie the townships of Bloomfield, East Orange, South Orange and Clinton; on the south are the townships of Clinton, Elizabeth City and Newark Bay. The Passaic River and Newark Bay form its eastern boundary.

The population includes nearly all nationalities, and by its easy access to New York City, furnishes pleasant homes for a large number of people who transact business there.

Its climate is mild and temperate, having an average temperature of 51.75°—its high range is 100°, and its low range, zero. Its rain fall during the year has been 44.6 inches. With a few exceptions it is delightful and healthy. During seasons when easterly winds prevail, catarrhal difficulties are aggravated by the moist salt air, and in the latter part of summer malarial troubles are increased by miasmata emanating from the great salt meadows, which lie between this city and the city of New York. These cover an extent of ten or twelve miles in length, and seven miles in width, with a soil composed, almost wholly, of vegetable matter, at all times saturated and partly covered with fresh water, which undergoes rapid evaporation and decomposition the effect of which is experienced in the upper portion of New York City and Long Island when westerly winds prevail. The recent diking of these meadows, preventing salt water from flowing over them, which would naturally retard fermentation and decomposition, may possibly be charged as the cause of any excess of malaria here, and for twenty miles or more around us, over that of the years preceeding the diking.

B—GEOLOGICAL.

The soil of the city is composed of red and yellow loams and sand, alluvium and drift, sandy clays, trap rock, shales and conglomerate red and brown sandstone, from which are quarried large quantities of brown stone, of a superior quality, used here and elsewhere for building purposes.

TOPOGRAPHY AND CONTOUR.

In general outline the city is very irregular. Its easterly, northerly, and southeasterly line conforms to that of the Passaic

river and Newark bay. Its longer axis is northwest and southeast. The older settled portion of the city lies about twenty or thirty feet above the sea and river. Thence westerly, quickly attaining an elevation of one hundred to two hundred feet, extending back on this plateau, to Bloomfield, the Oranges and Clinton townships. Its southern, southeastern and southwestern portion is situated on low meadow or flat lands, which are nearly on a level with the bay, and only about twelve feet above the ordinary tides, and during high tide it is partly covered with water. The length of the city is five and one-quarter miles; its width is four and three-quarters miles, and its area about eighteen square miles.

C.—WATER-SUPPLY.

Our water-supply is mainly from the Passaic river, a part from driven wells, and some from wells in various parts of the city, and is at times of an inferior quality.

That taken from the river and driven wells, is collected in reservoirs in different parts of the city, brought from the township of Belleville, through large iron pipes.

The admission of about two million gallons of water from the driven wells, into nearly ten million gallons used by the city daily from the reservoirs, has, in a measure, improved its quality, but there are times when its odor and taste are unpleasant; when chemicals and other substances, soluble and insoluble, are observed. Water, so important an element in our subsistance, when not pure, must necessarily prove deleterious to health and life, and unquestionably serves to increase the percentage of mortality.

D.—DRAINAGE AND SEWERAGE.

Underlying the more thickly populated, and to some extent, he less thickly settled portions, the city is extensively and fairly well drained by a system of sewers, which aggregate forty-eight miles, built of brick and pipe.

All improved streets, paved or unpaved, have stone gutters, which connect with sewer basins, and the water with that of the sewers, emptied into the river and bay, where the drainage soon becomes neutralized by the salt water of the tides. There are,

however, sections which are not thus favored, particularly the southwestern part of the city, where a creek receives the drainage of about twenty-five hundred acres of land, fifteen hundred of which are in the city of Newark, and one thousand in the township of Clinton. The drainage from Newark terminates by two main sewers, and is discharged into a ditch leading to Bound creek near, and west of the crossing of the Pennsylvania Railroad. This crossing has a culvert with a capacity inadequate to admit the free flow of the creek, when swollen with high tide and heavy falls of water; the drainage thus obstructed, causes a deposit of sewerage upon the low lands in the neighborhood, giving rise to bad odors, and must prove most injurious to the health of those residing in the vicinity.

This unfavorable condition has been presented to the attention of the Board of Health and the city authorities at several different times, who are now considering how best and speedily to remedy the evil, but up the present time, no definite action has been determined upon to secure this much needed relief. While our sewerage is fairly extensive, the sanitary requirements are increasing, and demand a more extended sewerage and more thorough drainage to decrease the list of mortality, which has been observed, especially in epidemics of scarlet fever and diphtheria. In some localities where sewers have not been laid, privy vaults and cesspools are defective in drainage, in consequence of rocky and clay bottoms. There are, in different parts of the city, vacant lots, which from their location and surroundings, are covered with stagnant water, producing complaint and disease, but the Board of Health are unceasing in their efforts to correct this condition, by draining, disinfecting and filling.

E.—STREETS AND PUBLIC GROUNDS.

The streets are generally laid out at right angles, broad, and to a large extent shaded by trees. The combined length of graded and paved streets is one hundred and seventy-seven miles—one hundred and thirty-one miles graded only, and forty-six miles paved with cobble stone, block stone, macadamized, Telford and wood. These wooden pavements, now condemned from sanitary considerations, and from want of durability and safety, are giving place to block stone.

PUBLIC GROUNDS.

The public grounds are enclosed parks, large and small. Three of them contain from three to five acres; four are much smaller. The larger parks are elegantly shaded, traversed by paved walks, lighted by gas, drained and furnished with seats. One only has a fountain of constantly flowing water.

F.—HOUSES AND THEIR TENANCY.

In the central portion of the city, included in the fire limits, the buildings are principally of stone and brick. Beyond this limit, they are of stone, brick, wood, &c., generally large, airy and commodious, and well ventilated, supplied with water from the reservoirs and many with drainage, which connects with the general drainage system of sewers, and others with cesspools. Most of the tenement houses are large, comfortable and cleanly, seldom, if ever, overcrowded. Some have modern arrangements for ventilation, but generally doors and windows are the only ventilators. No families live exclusively in cellars. Cleanliness of premises is either voluntary or compulsory.

G.—MODES OF LIGHTING.

Gas and kerosene are the common means of lighting. Electric lights are being introduced, and one of the public markets is wholly lighted by it; also one theatre and other buildings. All other public buildings and streets are lighted by gas. Two and a half million feet of gas is used for this purpose during the year.

H.—REFUSE AND EXCRETA.

Refuse which accumulates in the streets is carried out of the city or deposited in designated places within its limits, for filling low places, daily in nearly all, and two or three times a week in the more remote streets, in wagons for that purpose.

The streets are thoroughly and well cleaned at intervals, but the large surface of cobble-stone pavement, irregular and uneven in many places, requires more frequent attention than is given, for the securing of health and comfort. And there can be bu

little doubt, that from the want of more attention in this particular, the malaria of our locality is increased.

The refuse from butcher and meat shops, under constant inspection by intelligent officers, is never allowed to accumulate or become offensive, but is removed in wagons to be utilized. If there should be exceptions to the rule, it is so by criminal negligence of parties who create the refuse.

Excreta is removed from the city in covered tubs or casks or tight box-wagons, when required by individuals, or by order of the health officer upon complaint.

I.—MARKETS.

There are two public markets, which are well managed institutions, conspicuous for neatness, good order and system. They are large, convenient and scrupulously clean.

J.—DISEASES OF ANIMALS.

The diseases of animals have been through the year, of a mild and ordinary character, till within the month of September, and to this date, an epidemic influenza or epizooty of a contagious character has prevailed. Fortunately recovery is the rule.

Dead animals, whenever reported, are removed at once in closed ambulances, to be utilized, or by scavenger wagons with refuse.

K.—SLAUGHTER-HOUSES AND ABATTOIRS.

Slaughter-houses and abattoirs are under the constant observation and control of the meat and health inspectors, who compel cleanliness and inoffensiveness. There are two slaughter-houses within the city.

L.—MANUFACTORIES AND TRADES.

This city is essentially a great workshop, and is one of the most extensive manufacturing cities in the Union; it includes nearly every variety of trade known in any civilized country, with artisans and workmen from every nation. The structures are generally supplied with most modern and improved machinery, and arranged for the convenience, health and safety of their occupants. In a city so large, so wealthy and enterprising, all

trades must and have exhibited a most rapid growth, and commerce has assumed large proportions.

M.—SCHOOLS AND PUBLIC BUILDINGS.

Our schools are under the management of the Board of Education. The number of teachers in the employ of the Board is two hundred and seventy, of which twenty-six are males and two hundred and forty-four are females. The Board occupies twenty-eight buildings for actual class-room work. The enrollment in the day schools is eighteen thousand five hundred and twenty-three, and the evening, nine hundred and fifty-five; in the normal school, sixty; high school, four hundred and eighty-nine; grammar school, four thousand six hundred; primary schools, twelve thousand seven hundred and sixty; colored schools, two hundred and twenty, and industrial schools, three hundred and ninety-four. The work of teachers is earnest and successful. The school buildings are large, elegant and expensive, intelligently designed for healthfulness, safety of their inmates and convenience for pupils and teachers.

These, and all other public buildings, possess most of the modern improvements that the tests of time and experience have approved, for ventilating, heating, lighting, draining and other necessary sanitary arrangements, and under the constant vigilance of the Health Physician and officers of each of the departments and interested citizens, are becoming more schooled to the necessity of preventing diseases, and increasing the means for promoting health and comfort, safety and convenience.

N.—ALMS-HOUSES, HOSPITALS AND CHARITIES.

There are many charitable institutions in the city, one of which, the alms-house, is a large building, situated on the outskirts of the city, from which drainage is easy. It is commodious and under good sanitary arrangements and regulations. No epidemic diseases have occurred during the year. There have been twelve deaths of adult males, four females and six children. The alms-house sick are under the direct care of the alms-house physician. An eye and ear infirmary has been established during the year by enterprising benevolence, and is thus maintained. A corps of capable surgeons is in daily attendance in this in-

stitution, who receive and treat all applicants for services, free. Over three thousand patients have received treatment during the year. The city has no hospital, but contributes the sum of $5,625 (for beds) annually, in equal amounts to St. Michael's Hospital, (R. C.) which institution is under the care of the Sisters of the Poor; the Hospital of St. Barnabas, (Episcopalian) and the German Hospital. There is also an Alms-house Hospital, which is used as a pest-house, when circumstances require.

A dispensary is open daily with a corps of physicians in attendance upon those who are not able and not required to pay for medical services. Besides hospitals, dispensary and eye and ear infirmary, the benevolent institutions include The Female Charitable Society, Orphan Asylum, Foster Home, Home of the Friendless, Women's Christian Association or Home for Working Women, Boys' Lodging House and Children's Aid Society; nine temperance benevolent societies; Roman Catholic; Society for the Relief of the Poor, three Orphan Asylums, Hospital and Industrial School, Schools of Brothers and Sisters of Charity, Home for the Aged, House of the Good Shepherd for the wayward. Two police stations afford temporary relief to wayfarers, and during the past year has given lodgings to 20,432, of which number 19,775 were males and 657 females. Eight city physicians attend at their homes, all the sick and injured poor who apply to them.

BATHING HOUSES.

There are two bathing houses (public.) The bathers number this year 112,164 males, 16,608 females. Total, 147,762.

O.—POLICE AND PRISONS.

Eighty-two miles of streets are under police supervision. The police force at present is one hundred and fifty men, uniformed, drilled and disciplined, daily in attendance at each of the two police stations, day and night, under the direction of sergeants, captains and chief of police. In the station-houses are lodging rooms for policemen, wayfarers, offenders of the peace and prison cells for criminals, for both males and females. In these buildings are running water, wash basins and water-closets, as

well as other necessary conveniences, well appointed, duly inspected and fairly clean.

P.—FIRE GUARDS.

The Fire Department consists of a Chief Engineer, four Assistant Engineers, one Superintendent of Fire Alarm Telegraphers, and an acting force of one hundred and ninety-eight men, of which thirty-eight men are permanent; ten steam fire engines, ten hose carriages, two hook and ladder trucks, one supply wagon and one gig, thirty-nine strong and capable horses, a fire alarm circuit of sixty miles of wire, ninety-two fire alarm boxes, one thousand one hundred hydrants, and fifty-two public cisterns. At all fires is a salvage corps, maintained by the Insurance Underwriters' Association. The Fire Department will compare favorably with the best in this or any other country in organization, discipline, appliances, bravery and efficiency.

Q.—CEMETERIES AND BURIALS.

Within the city limits are three cemeteries and several burial grounds. The cemeteries are laid out and arranged with great care and expense, beautifully shaded, traversed with labyrinths of avenues and walks, ornamented with flowers and shrubs, and containing reception vaults; under the care of superintendents and keepers, and these under the control of the city health officers and common council.

There are also burial grounds which are in disuse, but well preserved and enclosed, and a city or public burial ground, (Potters field) where burials are free.

R.—PUBLIC HEALTH LAWS AND REGULATIONS.

The laws and regulations of public health here are necessarily extensive, an epitome of these may be obtained from the powers and duties of the Board of Health, and of officers who constitute that Board, whose meetings are held at such times and places as they may deem proper to provide for the protection and maintenance of the health of the city, by compelling cleanliness, preventing and abating and removal of nuisances, by sending non-residents with infectious diseases to the pest-house or hospital.

The removal of residents to the hospital upon recommendation, the removal of all or any residents to the pest-house who have infectious diseases, upon the written certificate of two physicians and of the Health physician, declaring the removal necessary for the preservation of the public health, the removal of disinfected goods when suspected of infection.

The purchase of medicines and remedies under the direction of the health physician, who also has control over the crews and passengers of vessels and crafts suspected of having infectious diseases on board, entering the city except by permission under penalty.

By causing to be displayed conspicuously upon houses where small-pox and other infectious diseases exist, signs, which shall not be removed without permission, under penalty.

The providing of suitable nurses for pest-houses, and by preventing any person from throwing offensive or unwholesome substances on the streets, ordering cesspools to be built and kept in order, sinks cleaned at night in an inoffensive manner.

Giving permission to clean sinks or privies by day, by certain processes, and by appointing sub-inspectors of health, and meat inspectors. These inspectors are under control of the health physician and Board of Health who hold their regular meetings monthly, and preceeding the meeting of common council.

S.—REGISTRATION AND VITAL STATISTICS.

Records are required from clergymen, of marriages, and from physicians of births and death, at stated intervals, to be sent to the City Clerk. The number of people in this city, according to the last census returns just made, is 137,163; of these 66,407 are males, and 70,756 are females; 96,841 are natives, 40,322 are foreigners; 133,874 are whites, 3,308 are colored (blacks and mulattoes); 10 are Chinese and 4 are Indians. The number of children between five and eighteen years of age is 41,935. The number of births during the year was 3,693. The number of deaths 2,851, and the number of marriages, 1,225.

U.—SANITARY EXPENSES.

The appropriation for the present year to the Board of Health is $9,000.

V.—HEATING.

all the public buildings and many private dwellings
l by steam, others by furnaces, but the greater number
the fuel is coal.

ITEM.

)e observed that the list of mortality in this city, from
st, 1879, to October 1st, 1880, is 2,851 which number
des still-born, and many from the three hospitals,
ane asylum, county jail and soldiers' home, who were
nts. Deducting these, our rate of mortality which is
per 1000, would be somewhat decreased. In present-
irst report of the City Board of Health to the State
have endeavored to give a fair and just report, so far
tion and limited data could aid us.
ret that the health physician, who has filled this posi-
and well, for many years, could not have given to your
result of his intelligent observations and experience,
from unceasing and untiring efforts, moral and physi-
nhance and improve our sanitary condition. His
impaired health has left the acting physician wholly
upon other resources, which necessarily render these
is complete, and less perfect than a report from his

Respectfully submitted,

C. M. ZEH,
Acting Health Physician.

ANNUAL REPORT

BOARD OF HEALTH OF THE CITY OF NEW BRUNSWICK.

BY H. R. BALDWIN, M. D.

NEW BRUNSWICK, N. J., October 1, 1880.

morable, the Common Council of the City of New Bruns-

MEN: The act entitled "an act concerning the protec-
e public health and the record of vital facts and statis-
ng thereto," makes it the duty of the Board of Health

of the City of New Brunswick to submit to your honorable body, on or about the first of October of each year, an annual report of the condition of the public health in our city, with other facts of interest in that connection.

The present Board of Health was organized under the provisions of the said act, on May 8, 1880. The gentlemen composing the Board, nominated by the Mayor and approved by Common Council, are Prof. D. T. Reiley, Mayor of the city, Drs. Henry R. Baldwin and Nicholas Williamson. *Ex-officio* members: Edward Tindell, Recorder of Vital Statistics, and Dr. Staats V. D. Clark, City Physician. The officers elected by the Board were D. T. Reiley, President; Edward Tindell, Secretary; S. V. D. Clark, Treasurer; Edward A. Reiley, Inspector.

Since the date of organization, stated meetings have been held weekly and semi-monthly, and considerable work has already been accomplished through the active agency of the Health Inspector, in regard to all forms of nuisance and matters deemed detrimental to public health. The Board was compelled to plan its work with some care. It was necessary, at first, to understand the general provisions of the act referred to, as well as of the new ordinance for the prevention and correction of nuisances, etc., approved September 16, 1879. Committees were appointed to hold conferences with the Commissioners of streets and sewers and the City Attorney, the object being to define the relative duties of the two Boards. By adopting this course, there has been no conflict of authority, but unity of action in the important work of guarding the public health. The members of the Board have cheerfully given their time and attention to a careful investigation of all matters of complaint, unpleasant as the nature of many of these complaints have been. This work, as your honorable body understands, is gratuitous, no member of the Board receiving any compensation whatever. As there was no apppropriation voted by the people to prosecute this work, although five hundred dollars was recommended for its accomplishment, it was necessary to ask your honorable body to make some provision for the pay of the Health Inspector, (an office created by the law, above referred to,) and a prompt compliance on your part with the request enabled the Board to go on with its work.

We do not deem it necessary to specify the various nuisances

have been abated during the past summer. A record of all
s of inspection and complaint has been carefully preserved
ıe Inspector, and all important reports, papers, etc., have
filed by the Secretary for convenient reference. Whenever
ıs been necessary the Board has directed the application of
force, under the direction of the city attorney. The com-
ıts, fortunately, in but one or two instances, only being pro-
ed under the provisions of the ordinance of September,
. In this connection we annex the number of inspections
ɜ, permits issued, and complaints investigated, from May 18
ptember 30, 1880, inclusive, as follows:

plaints	91
ections	278
ıits	237

ɹe has been exercised to conduct this work so as to avoid, as
ıs possible, unpleasant feelings between neighbors, and
:ercise compulsory force only when absolutely necessary.

, a meeting of the Board held on May 24, the Health
ector was instructed to inspect the First and Second Wards,
special reference to the condition of drains and the facili-
for the escape of waste-water and sewage. A report was
e showing the result of this inspection, which was approved
ıe Board. A committee was subsequently appointed to make
rther examination of these water-courses, particularly what
ıown as "Fisher's Brook." An important paper on "Disin-
nts, and How to Use Them," was also prepared by the
ector and approved by the Board; also a paper on the
ıdition of the Gutters of this City," by Dr. Clark.

ıe above reports or papers were furnished by the Secretary
.e newspapers of the city for publication, and the proprietors
ıese journals, recognizing the importance of intelligent sug-
ons touching upon sanitary precautions or recommenda-
ı, cheerfully made room in their columns for these papers.
ıe suggestions were thus brought to the homes of our people
made of practical benefit to them.

record of vital statistics, as reported to the Secretary of
ɜ, by the City Clerk, for five months, or from April 15 to
ember 15, inclusive, we here annex, as follows:

ımber of marriages, 52; number of births, 173; number of

deaths, all causes, 197; number of deaths of children, under five years, 96; number of still births, 19.

In reference to the general health it becomes our duty to report any serious deterioration thereof or hazard thereto; and in accordance with this enactment we beg to report as follows:

We are happy to say that there has been no more serious deterioration of the general health than has heretofore existed, save with two exceptions. The usual amount of infantile disease has existed, but not in malignant form. Still during the early summer the extreme heat was quite inimical to the lives of infants. Contagious and infectious diseases have also visited us, but not in such form as to be beyond control. One of the above exceptions has reference to the unusual prevalence of malarious diseases, which have been present in a degree unknown in this community during the last quarter of a century. Frequent cases of intermittent and some remittent fevers have called for the timely aid of the physicians. This seems to be largely due to the character of the last winter, and the absence of severe frosts, and somewhat also to the subsequent drought. The soil being saturated with vegetable matter in condition for decay, and the summer sun liberating the emanations, which have produced their characteristic effects. It may also be stated that the recent raising of the dam, at the site of the water-works, and the consequent flooding of new meadow land, may have so impregnated the drinking water with vegetable matter as to afford a suspicion that some of the intermittent may have arisen from this source.

The second instance of deterioration of the public health may be noticed as the prevalence of a number of cases of typhoid fever. As this is classed among the preventable diseases, it should exist only in the least possible degree; and whilst in the absence of positive statistics, it is unsafe to state positively the amount of typhoid prevailing in our midst; yet from inquiries directed to several physicians, whose practice covers a considerable portion of the town, it seems that we have more cases of this disease than belong to a city of good sanitary condition; but it is safe to assert that a general absence of the conditions of salubrity must exert a powerful influence in producing the disease, such as water taken from impure wells, bad sewage, and the foul condition of the gutters, which latter exists to an outra-

geous extent, and in the absence of legislation empowering the Board of Health to act promptly, must necessarily continue. Regarding any hazard to the public health, we are happy to say that an abundant supply of water, in general of wholesome character, (with the exception of the hint above given, and which is only temporary) has afforded a great protection; yet there are some portions of the town in which the water is drawn from wells, which are liable to all the deterioration arising from soakage of the soil with detrimental substances. We cannot pass by another large danger to the general health of the city, from our imperfect system of sewage which now exists, viz: the emptying of our sewers, as well as all the surface drainage of the streets into a slack water, (the Delaware and Raritan Canal). It will be readily seen that the deposit of animal and vegetable matter, the refuse of a large town, must contain elements most prejudicial to health. When, therefore, this basin is exposed to the sun as is occasionally the case, with its bottom covered with reeking filth and human excreta, can we conceive a more unwholesome state of affairs. It is not asserted that the germ or poison of typhoid is thus propagated, still there can be no doubt that the influence upon the general health is such as to favor the development of whatever specific causes of disease may either exist or arise.

SUGGESTIONS.

The Board of Health suggests the following amendments to the present ordinance:

To Sec. 3. And anything whatsoever that shall be deemed by the Board of Health prejudicial to the health of the community.

To Sec. 9. That no animals be buried within the city limits without the permit of the Board of Health.

To Sec. 10. That the Board of Health at any time may require the owner of any cesspool and privy-vault to cement it in such a manner as to make it water-tight, and that all cesspools and privy-vaults hereafter constructed to be under the same authority.

To Sec. 18. The carrying on of all occupations should be under the control of the Board of Health so far as they may judge them to be nuisances or injurious to health, and permits must be obtained from the Board of Health for carrying on such business.

The right of the Board of Health, or their officers, to enter premises, has been omitted from the new ordinances and should be inserted.

Persons should be required to use disinfectants upon their premises according to the judgdment of the Board of Health. Quicker action should be possible than a three days' notice, as in case of an epidemic or a recently created nuisance. The Board of Health should have the fullest power to vacate, disinfect and cleanse premises, or cause them to be so vacated, cleansed and disinfected.

Houses occupied by two or more families (tenement houses) to be furnished by the owners with proper means for carrying away waste-water, slops, etc., to be constructed in accordance with the directions of the Board of Health.

Whenever sewers exist, the Board of Health should have the power when they deem necessary of compelling connections to be made therewith.

The following points can only be reached by application to the Legislature:

1st. Greater power and clearer procedure of the Board of Health when nuisances are within the domain of the commissioners of streets and sewers.

2d. Physicians should be obliged by law to furnish reports periodically of contagious and infectious diseases to the Board of Health.

Respectfully submitted,
D. T. REILEY,
HENRY R. BALDWIN,
EDWARD TINDELL,
Committee.

Attest: EDWARD TINDELL, Secretary.

Accepted and ordered filed by Common Council, October 4, 1880.

EDWARD TINDELL, City Clerk.

ATLANTIC COUNTY.

ABSECON. - - *Report from* E. H. MADDEN, *Absecon.*

ATLANTIC CITY. *Report from* THOMAS MCGUIRE, *Atlantic City.*

C.—The water-supply at present is from cisterns. The carelessness of many of the old inhabitants in not attending to their cisterns properly is the cause, no doubt, of some sickness. Others not having cisterns, use the surface water, and, I think, in the fall of the year this causes malaria. I am in hopes before another year we shall draw our supply of water from the mainland or artesian wells.

V.—One of the most important functions of the Board is that concerned in the investigation and suppression of nuisances. There are a number of cases reported, and some are so complicated that they involve careful and patient investigation and assiduous care in their management. A great deal of unnecessary, as well as unpleasant labor, is forced upon the Board by the refusal of persons, after proper notification, to abate nuisances for which they were responsible, thereby obliging the Board, in furtherance of the public weal, to authorize the work to be done, and institute proceedings at law for the recovery of the expense. We feel that there is a straight line of duty to pursue, and as far as we know the right, we mean to pursue it.

The importance of a sewer system based upon a regular established grade is insisted on. This illustrates how important it is that every city should have a complete sanitary sewerage and map as preliminary to all drainage, sewerage, or grading plans.

BUENA VISTA, - - *Report from* JOHN FAUX, *Vineland.*

EGG HARBOR TP., - - *Report from* L. CONOVER, *Absecon.*

The only prevalent disease reported is that of chicken cholera. It may be said here that under the head of diseases of animals, many of the reports from various sections of the State allude to the disease and the serious loss to farmers thereby. A new

interest attaches to it from the fact that Touissant and Pasteur seem recently to have shown that the disease is owing to an oval-shaped micro-organism. Pasteur has taken this and cultivated it in other media, such as decoction of muscle. The germs from a decided case are made to multiply in a muscle-decoction or culture fluid. If this fluid is used at once it produces a severe form of the disease. But if allowed to stand for months and then used, it produces a very mild form of the disease, which protects the fowl from another attack, just as vaccination protects from small-pox. Pasteur is believed by many to have discovered a method not only of preventing the virulence of fowl cholera, but also that of hog cholera, pleuro-pneumonia, and many other diseases of animals. The subject is of the greatest interest, not only pecuniarily, but in its bearing on human diseases.

GALLOWAY TP., - *Report from* GEORGE W. ALLEN, *Oceanville.*

The report notices pulmonary diseases as affected or produced by the heavy sea air.

HAMILTON TP. *Report by* D. B. INGERSOLL, M. D., *May's Landing.*

The report presents answers to all the schedules, and is emphatic upon the increasing evils arising from the use of tobacco as an "injury to the health of community and especially to the youth and children of our land." The increase of this use by those young in years is certainly a subject worthy of the attention of our citizens Some cases of typhoid-malarial fever, a disease unusual in that section, are noticed.

HAMMONTON TP. - *Report by* M. L. JACKSON, *Hammonton.*

MULLICA TP. - - *Report by* W. S. MILLER, *Pleasant Mills.*

The report properly protests against the careless deposit of the garbage of Atlantic City, brought to it, under contract, on cars, which themselves become offensive and hazardous to the public health. This township was one of those in which, at first, a Board of Health was felt to be unnecessary, but soon had an

illustration of how important it is to have some health authority in every district.

WEYMOUTH TP. - *Report from* ANTHONY J. PARKER, *Tuckahoe.*

BERGEN COUNTY.

LODI TP. - *Report from* JOHN VANBASSUM, *Coroner.*

MIDLAND TP. - *Report from* JOHN G. ZABRISRIE, *Areola.*

The report notices nothing unusual, save the uncommon prevalence of malaria.

NEW BARBADOES TP. *Report from* H. H. ZABRISKIE, *Hackensack.*

The prevalence of malaria is noticed. We quote from the close of the report as follows:

"The operations of our Health Board since its existence, have been satisfactory in good results, by awakening the attention of our people to the existence of unsanitary conditions in their midst; many of which have been radically changed.

"If our Legislature will make more definite the manner of prosecution for delinquencies in regard to sanitary observances together with a much needed provision for the appropriation of pecuniary means by the township committee, for securing needed reforms, we have before us, through the increasing sanitary knowledge of our population, the prospect of good work soon to be reported, for the whole field of our supervision."

PALISADE. - *Report from* PETER BENDER, *Schraalenburgh.*

The report refers to malaria as common, although not so severe as the previous summer. Bronchial and lung troubles also seem on the increase, as is generally the case where there is imperfect drainage and accumulations of vegetable matter.

RIDGEWOOD, - - *Report from* I. A. MARINUS, *Ridgewood.*

SADDLE RIVER, - - *Report from* W. H. GILL, *Ridgewood.*

UNION, - - - *Report from* G. R. ALYEA, *Rutherford.*

BURLINGTON COUNTY.

BEVERLY CITY, - *Report from* ELIAS LONGSTREET, *Beverly.*

The Board has inspected the cellars, wells, privies and drains of a large part of the town, and requested citizens to report all nuisances on public or private grounds.

BORDENTOWN TP., *Report from* LUCIEN HUNT, *Bordentown.*

BORDENTOWN CITY, *Report from* DANIEL G. WALKER, *Bordentown.*

The town is defective in its drainage and sewerage.

BURLINGTON CITY.

The report shows a well organized Board, but owing to the lateness of its organization, full items could not be furnished.

CHESTER TP., - - *Report from* I. C. STROUD, M. D.

There has been intermittent fever of an unusually severe type. A fever would set in and last for forty hours, and the patient would be very delirious * * We have a low, flat stream of water, very sluggish in its motion, and an abundance of weeds and grass all along the stream for seven or eight miles, to which has been attributed the great amount of fevers in our neighborhood.

CHESTERFIELD TP., - *Report from* CHAS. D. LIPPINCOTT, *Crosswicks.*

CINNAMINSON TP., - *Report from* I. D. JARNEY, M. D., *Cinnaminson.*

EASTAMPTON TP., - *Report from* WM. G. LIPPINCOTT, *Mt. Holly.*

Some malaria this year, and a severe type of diphtheria.

LITTLE EGG HARBOR, - *Report from* T. T. PRICE, M. D., *Tuckerton.*

The report speaks of the uniform health of the township: "Its mild, marine climate renders it a favorable abode for consumptives. We have no malaria."

LUMBERTON, - - *Report from* ISAAC FENMORE, *Lumberton.*

MANSFIELD, - - *Report from* AMOS BLAKE, *Columbus.*

NEW HANOVER, - *Report from* GEORGE C. DAVIS, *Wrightstown.*

"There is no system of drainage or sewerage other than by natural means, or what may be built and used by private parties as they may individually think necessary, refuse and excreta being disposed of as is customary among farmers. I would here just mention to the Board the great neglect of farmers owning marshy and low lands, in not draining them. Almost every farm in the township has several acres of that kind of land, which could be converted into good land for pasturage, worth more, acre for acre, than any on their farm, besides making their plantations more healthy. In fact, I believe these low, marshy places, running up, as they do in many instances, back of the dwellings of those that live in them, are the cause of so many diseases. The water becomes stagnant and polluted with all the foul gases of the air, therefore creating the very germ for malaria, &c. I would here call the attention of your honorable Board to the necessity of having a uniform system of drainage throughout the State, both for the interest of the farmer and the welfare of humanity in general. I would here suggest to your honorable Board that it appeal to the Legislature, at its coming

session, to make a provision in some way to encourage a system of thorough drainage throughout the State."

"Some of our school-houses are badly ventilated, being built in olden times, when people built school-houses to correspond with their out-buildings on the farm, not caring for the health and comfort of their children any more than they did for their swine, crowding their children together in low, cramped-up buildings, inhaling the same air over and over again, until sickness came upon them, to be taken home to be physiced up, to go through the same process again."

NORTHAMPTON, *Report from* F. ASHURST, M. D., *Mount Holly.*

PEMBERTON, - *Report from* WM. P. MELCHER, *Pemberton.*

There are no other public buildings except the Burlington County Poor-house, situated two and a half miles east of the borough of Pemberton. This institution was founded in the year 1800. The farm comprises six hundred acres, of which four hundred and thirty is tillable land, the balance brush and woodland. The institution comfortably accommodates three hundred and twenty-five inmates. The number at present is two hundred and seventy, females being slightly in the majority. Number colored, forty. In the insane department there are: males, twenty-three; females, forty-five. Number discharged, improved, during the last six years was twenty-nine; males eight, females, twenty-one. Of this number (29) eleven (two males and nine females) came from the State asylum. Average number of inmates for year ending May 12th, 1880, three hundred and fifteen; number of deaths, twenty-seven; births, seventeen.

RANDOLPH TP., - *Report from* CHAS. T. ALLEN, *Lower Bank.*

SOUTHAMPTON TP,, - *Report from* J. H. BROWN, *Vincentown.*

The only thing that we are bothered with as a prevailing disease is the ague.

WASHINGTON TP., *Report from* CHAS P. NICHOLS, *Green Bank.*

CAMDEN COUNTY.

AMDEN, - *Report from* ALEX. J. MILLIETTE, *Camden.*

ENTRE TP. - - - - EZRA C. BELL, *Mt. Ephraim.*

There have been some cases of malarial fever this year.

ELAWARE TP. - - - ABEL HILLMAN, *Haddonfield.*

The prompt action of this Board, in reference to a case of all-pox which occurred in a laborers' boarding house, no ubt prevented the extension of the disease.

LOUCESTER CITY. - - ALFRED HILLMAN, *Haddonfield.*

This Board has issued every precaution they thought neces-ry, looking to the city's welfare. Communications from the ty Physician, with reference to nuisances and of parties having em, having been received, their places have been visited by e Board and the evil abated. There were one thousand ,000) circulars printed and distributed throughout the city, lling the attention of citizens to the uncleanliness of yards and her places.

The Camden county Alms-house contains one hundred and fifty-e patients, and a new hospital has been erected during 1879, ving a capacity for forty beds, and will probably be opened r the reception of indigent patients during the year. On the me county premises, there has recently been built an asylum r the insane, with accommodation for seventy-five patients. resent number, fifty-eight.

The Board made a careful inspection of these two institutions, d found the sanitary condition good, except the ventilation d sewerage of alms-house, which are sadly defective. he asylum was found perfect in every respect, except [a oper ventilation of water-closets, these being inefficient to convey f the various odors emanating from them. The local Board of

Health respectfully refer the same to State Board of Health for their investigation.

The general health of these two institutions has been impaired by the prevalence of malarial fevers, which are endemic to the locality, and cannot be prevented only by large expenditure or removal of the buildings from their present sites, which are located on the south side of a drained meadow, receiving all the decayed vegetable matters for several miles up the stream. Their drinking water is obtained from a pond covered, during the warm season, with algae, and when carried to the respective buildings contains the deposit to a visible extent. No epidemic diseases have prevailed and the inmates have been thoroughly vaccinated. All our school trustees have, within the knowledge of the Board, complied with the requirement of the law in having all the children in the respective districts vaccinated.

As a supplement to this report, permit us to refer briefly to a circumstance by which a timely precaution and investigation has averted an outbreak of typhoid or typho-malarial fever. At the County Insane Asylum a well was dug in July, eighteen feet deep, outside of main building but inside of a rear annex, in close proximity to a main sewer pipe; the water, after a few days, became intolerably offensive to taste and smell, so that it was advised by the attending physician to abandon it and close it securely. Various theories originated in reference to the impaired quality of water from this well; some attributed its offensiveness due to organic matter from the old pauper graveyard, upon which the building was erected in 1879, others to a leakage in the main sewer pipe, which had either accidentally been struck in digging the well, or from fracture of pipe, caused by settling of foundation walls of the building. The latter supposition we regard as most probable, and a careful analysis of the water, made by an expert chemist, reveals its constituents as phosphates, sulphrates, and a large per cent. of organic matter.

The officers of institution propose having sewer pipe carefully examined. Signed

R. B. STEVENSON, *Chairman.*
E. J. COLES, *Secretary.*
J. W. MCCOLLOUGH, M. D.,
Township Physician.

Dr. McCullough also furnishes the following account of a number of severe cases of sickness that occurred in Gloucester and Centre townships.

BLACKWOODTOWN, N. J., September 29, 1880.

DEAR SIR: Excuse delay in complying with your request, in contributing to you the desired information in reference to a sickness which prevailed in this locality. The cases occurred in the townships of Centre and Gloucester, which are situated five to ten miles southeast of Camden city, bounded west by Timber creek, (a tide-water creek,) flowing into the Delaware. The inclosed map, hastily drawn, for your better understanding of the situation, will also give you a correct idea of the geographical limits of the fever.

I have a record of thirteen cases, personally treated, and as many more occurring in the same locality, and treated by my colleague, Dr. H. E. Brannin, also Doctors Shivers and Quint; total, thirty cases. The first cases occurred about the first of August, 1879, and obtained the greatest prevalence in September, with a few cases in October, and all ceased in November. The area of county infected was two miles in extent, and as near as I am able to estimate, one person in six and two-thirds of population contracted the fever, and the death rate was nearly nineteen per cent. The deaths in my practice, from the so-called typho-malarial fever, were two, and total six in the practice of all the attending physicians.

The incipient stage was marked with the usual premonitory symptoms of languor, mental depression, feeling of coldness down the back and persistent headache, with succeeding febrile symptoms, furred tongue, frequent pulse, epigastric tenderness, and urine scanty and high colored; the diurnal remissions occurring in the morning, and exacerbations taking place towards evening. This condition remained for an indefinite period, until the remission became less noticeable and until the thermometer failed to detect any but a steady and unvaried course of fever of a typhoid character. The principle features were a pulse varying from one hundred and twenty to one hundred and fifty, temperature one hundred and two to one hundred and four, dry, red, and brown tongue, generally a bronchial complication, tympanitis, and often profuse diarrhœa, slightly hemor-

rhagic, delirium relapsing into stupor, and the cases terminated before twenty-first day, in death or a tedious convalescence. The treatment pursued was the alkaloids of cinchona, first, and alteratives, and after assuming the typhoid character we abandoned quinia and substituted the acids with stimulants, beef tea, milk, &c., with turpentine and bromidis and opium, to meet local indications. These cases occurred in a malarial locality, along the east side of Timber creek, where intermittents every year prevailed and afflicted the old residents all their lives.

It was the frequent observation of watermen, who followed the creeks, and the residents, in close proximity to the same stream, that the tides were lower last season than any previous period in their recollection, which would account for the greater prevalence of malaria; but this theory is not well sustained, and, in my opinion, there was less intermittent in 1879 than in the present year 1880.

To properly and effectually solve the real origin of the typhoid element, which was one of the conspicuous features, we must search for the principal cause, viz: The use of material which had been hauled from Philadelphia, and extensively employed by farmers and truckers on their lands, and from deposits on the various landings on the creek. These fertilizing manures were ill-smelling and offensive at considerable distances, and consisted of street dirt, blood from abattoirs, and soap fat, &c., from Philadelphia. The majority of cases occurred in the vicinity of a putrid heap of manure, and all fatal cases, with one exception were in the same locality as the manure pile.

A farmer who dealt extensively in this latter material lost a son, and his two daughters were simultaneously seized and prostrated with the same fever, recovering, finally, after a tedious convalescence. Another farmer, his nearest neighbor, quarter of a mile distant, was stricken, afterwards a daughter, both of whom died. Directly across the road, a young married lady was prostrated and died; many others, at close distances from the first outbreak, were taken. It has been suggested that impure water might have been found at the door of these families, and the water might have developed, by analysis, some organic matter, as hog pens and barn yards were sufficiently near three places, where the fever occurred, to give a semblance of truth to this

theory; but these families had been drinking water from the same wells for many years and the water was apparently healthy in quality. I cannot share in the opinion that this was the chief cause. There have been no cases of fever of a typhoid grade in this locality the present season. The inhabitants are drinking the same water and throw their deposits of house on the soil near the house. No more of these offensive manures have been used in the neighborhood since 1879, and since we have had no outbreak of fevers.

HADDON TP., - - - J. STOKES COLES, *Haddonfield.*

STOCKTON TP., - PHILIP W. BEALE, M. D., *Cramer's Hill.*

Three cases of small-pox which occurred were promptly attended to, and houses fumigated and vaccination performed. There was no further spread.

CAPE MAY COUNTY.

CAPE MAY CITY, - - ELDRIDGE JOHNSON, *Cape May.*

The Board has several times abated nuisances. The following is a part of their ordinance and their form of notice:

SEC. 2. *And be it further ordained and enacted,* That the Board of Health shall have power, and it shall be their duty, to make and by order direct to be made, through the Mayor, by the Marshal or any police officer, diligent inquiry with respect to all nuisances, of every description, which are or may be injurious to the public health, and to abate the same in any way or manner they may deem expedient. Second—to stop, detain, examine, and by order to direct to be stopped, detained and examined for the purpose of preventing the entrance of any pestilence or contagious or infectious disease in the city, any person coming from any place infected or believed to be infected with such disease, and to prevent such person from coming into the city. Third—to remove from the city or cause to be disinfected or destroyed any furniture, wearing apparel, goods, wares, merchandise, diseased animals *or other property of* any kind landed by railroad or

steamboat or other conveyances, or stored in the city, which shall be suspected of being or sworn to be tainted or infected with pestilence, or which shall be likely to pass into such state as to generate or propagate disease.

SEC. 3. *And be it further ordained and enacted*, That every person who shall be served with a copy of any order made by the Board of Health, under the powers conferred by this ordinance, and shall neglect or refuse to obey, or comply with the same, shall forfeit and pay, upon due proof before the Mayor or Alderman, a fine of twenty dollars for every offence, and stand committed until fine and costs are paid.

LOWER TOWNSHIP, - - CALEB WOOLSTON, *Fishing Creek.*

CAPE MAY POINT, - - D. C. GODFREY, *Cape May Point.*

CUMBERLAND COUNTY.

BRIDGETON, - - - DANIEL B. GINENBACK, *Bridgeton.*

The report furnishes particulars, valuable for future reference, as do many others from which no special extracts are made.

DEERFIELD, - - - - JOHN W. AVIS, *Deerfield.*

HOPEWELL, - - - CHAS. H. DARE, M. D., *Shiloh.*

LANDIS, - - - - - - - WILLIAM ROBERTS.

A full report of all details as to the township.

MAURICE RIVER, - - - ISAIAH LORD, *Heislerville.*

STOE CREEK, - - - EPHRAIM MULFORD, *Roadstown.*

Millville and Downe report Boards of Health.

ESSEX COUNTY.

BELLEVILLE, - - - D. M. SKINNER, M. D., *Belleville.*

The report notices improvements being made in the condition of streets and in drainage; the good arrangement for preserving life and property in case of fire, and the need of improvement in one of the school buildings.

BLOOMFIELD, - - - JOSEPH K. OAKES, *Bloomfield.*

U.—We have spent sixty dollars the last six months, the most of which was expended in ditching a piece of ground (about six acres) near the centre of the town. The sewerage from neighboring houses was deposited on it. By making this ditch, we get rid of this sewerage in a great measure, and have made the land through which it passes comparatively dry. We think it will be the means of increasing the health of that part of the town. We expended ten dollars in another part of the town, to cut a ditch so as to drain a stagnant pool of water. The Board has had a number of complaints on account of nuisances. The Secretary has written notices to those persons complained of, who have, in most instances abated the same. We would suggest that the Board of Health have power to appropriate money for sanitary purposes. It might be limited not to exceed a certain sum, say one hundred or two hundred dollars for one year.

W.—Complaint was made to the Board early in the season, of the condition of the water in Toney's brook. The Board investigated the matter, and came to the conclusion that the impurities of the water were caused mostly by factories in Mt. Clair township. On the stream, in Mt. Clair, there are two factories; the upper one, where they make and print labels for all kinds of goods, the refuse coloring matter they throw in the stream. The lower factory in Mt. Clair, is a straw-board factory; in preparing the straw and reeds, (from the salt meadow) they use alkalies and acids, and a considerable portion of the refuse gets into the stream. Also, over the stream, in Mt. Clair, there is quite a number of privies. The consequence is, when the water gets in the next *pond below, which is* in Belford, it is pretty well satu-

rated with impurities. There are three ponds in a circumference of half a mile in Bedford. When these ponds are low, in warm weather, it takes some time for them to fill up; in the meantime, the sun acting on this mass of polluted water, causes a smell or gas, which is injurious to the health of the place. We wrote to the Montclair Board of Health, to ask them to co-operate with us in the abatement of the nuisance. They appointed a committee of their Board, (Dr. Pinkam was chairman) who examined and analyzed the water in the ponds of Montclair and Bloomfield. In their report, they state that the water in the Bloomfield ponds is far more impure than the water of the Montclair ponds (the water is so bad that there is no living fish or snake in it). The committee also recommended the factory owners to keep their refuse matter out of the stream. Do not think this has been done to any extent. The question arises, what can be done to abate this nuisance? We should be pleased to have the counsel of the State Board of Health, so that next summer we may be prepared to take some measures to abate this evil.

CALDWELL, - - - - - C. M. HARRISON, *Caldwell.*

During the past year several cases of malarial fevers occurred on the line of a small stream flowing through the village of Caldwell. It was noticed that the waters on a small pond nearly in the center of the village were coated over with a peculiar growth of algæ. Mr. H. H. Rusby, a botanical expert, made an examination of this algæ under a magnifying power of four hundred diameters. He found nine species.

The existence of this algæ I took as being evidence of something more than a condition of stagnant water; for they had not been observed before. Of course no evil could result directly from these growths *per se*, but the contamination of the water proved that an evil was to be remedied. An examination of the stream above, showed that at one or two points, privies were located nearer the brook than they should have been, and that the overflow from cesspools on the grounds of the penitentiary, reached and poisoned the waters of the brook. At points in the stream, where the flow was very slug-

gish, the water was found to be swarming with animalculæ. The wastage from the cooking and washing rooms of the penitentiary for the past two years, has in unreasonable quantities, escaped into this brook, and no doubt the cases of malarial fever referred to can be directly traced to this source. Parties were notified, but the evils complained of have been mitigated only—not removed.

During the heated term in August of the present year, two cases of typhoid and several of malarial fever occurred at Newark City Home. This institution is beautifully located on a shelving portion of the eastern slope of the Second Mountain. The institution belongs to the city of Newark, and our local Board here refers to the matter only because the facts developed are pertinent to such a report as this. The examination was made by our secretary who was recently appointed to take charge of this institution. He found the plumbing exceedingly defective, and that portions of the building were infected with sewerage gases. The traps of the pipes were no where ventilated, and in some cases the pipes themselves were filled with noxious matter and unserviceable. Alderman Chas. Marsh, of the Trustees, took the matter in hand in an energetic and business like manner, changed the system of drainage throughout, and provided proper ventilators. The sanitary condition of the building is now, in most respects, excellent. It is worthy of note in this connection that the most malignant case of fever was developed in a young lad of fifteen years, whose bed was next adjoining a most defective water-closet. These facts are worthy of attention, because their study enforces truths which must be regarded in the construction of public dwellings.

The healthfulness of the township has been unusually good for the year past. The farmers have had no contagious diseases among their cattle or other stock. The so-called epizootic during the fall months, was of the lightest type, and produced no disarrangements among the teamsters. Chicken cholera has raged here and there, involving small losses, but, beyond this, we have nothing other to report.

With ample facilities for thorough drainage, Caldwell may place herself in an enviable position so far as a clean, pure and dry local atmosphere is concerned. Herein we have the first condition of general healthfulness.

CLINTON TOWNSHIP, - - D. S. SMITH, M. D., *Irvington.*

A communication from citizens, was made stating their grievances, arising from the sewerage deposits upon the meadow lands of the township, by the city of Newark, it being, in their opinion, health-destroying, through exhalations from such noxious materials, and praying this Sanitary Board to take cognizance of, and if possible, deliverance from the same. The communication was accepted, ordered on file, and a copy to be sent in the report to the State Board of Health.

At a meeting of the citizens residing in the southeastern portion of the township, holden this day, October 9th, 1880, at the house of Caleb Earl, for the purpose of deliberating upon the deleterious effects of the sewerage deposits upon the meadow land, by the city of Newark, and consulting together as to the propriety of taking action thereon, Mr. Henry Meeker was appointed chairman, and Dr. Isaac M. Wood, secretary of the meeting. After a full and free expression of opinion as to the health-destroying exhalations from such noxious materials, attested by the production of miasmatic disease through the neighborhood, as well as blasting (by the nauseating affluvia engendered) the character of this section of the township, so hindering its material prosperity, it was unanimously

Resolved, That the Chairman and Secretary be instructed to present in our behalf, our grievances to the Sanitary Board of the township, praying them to take cognizance of the same; and in if their wisdom, deliverance from it be possible, to interpose, in our behalf. With the request that our Secretary present this our appeal to the Sanitary Board, at their first meeting, duly signed by the officers of this meeting, the same was adjourned.

Several Freeholders appeared and presented complaints against three parties for receiving foul or noxious materials, and allowing the same to be deposited upon their lands. The Clerk of the Board was directed to serve notices upon the several parties (excepting the sewerage nuisance of Newark) demanding removal and discontinuance of the same.

LIVINGSTON TP., - - - S. H. BURNET, *Livingston.*

MILLBURN, - - - - A. J. R. SIMPSON, Millburn.

NEWARK, - - - - - C. M. ZEH, M. D., *Newark.*

Report already given.

SOUTH ORANGE, - - A. M. RANSOM, M. D., *South Orange.*

The report notices the very low death rate.

WEST ORANGE, - T. MEREDITH MAXWELL, M. D., *Orange.*

GLOUCESTER COUNTY.

CLAYTON TP., - - - - - T. S. TURNER, *Clayton.*

FRANKLIN TP., - - - - - J. C. RICHMAN, *Malaga.*

The report notices the necessity of guarding against the illegal practice of unskilled or unprincipled practitioners.

GREENWICH TP., - - - JOHN STETSON, *Paulsboro.*

GLASSBORO, - - - - - JOHN E. PIERCE, *Glassboro.*

The report refers to the successful action of the Board in correcting a slaughter house nuisance. Some cases of pleuro pneumonia occurred in this township. The intelligence of Local Boards, as to it, can be a great aid in its suppression.

MANTUA, - - - - B. A. CORSON, *Mantua.*

Four cases of small-pox occurred in the township, but all ecovered. Prompt attention prevented the spread of the disease.

WEST DEPTFORD TP., - JAMES T. BUDD, *Woodbury.*

WOODBURY CITY, - - R. S. CLYMER, *Woodbury.*

A plan and survey of the whole city is about completed and a system of drainage and sewerage is to be adopted.

WOOLWICH TP., - - SAMUEL AVIS, *Swedesboro.*

HUDSON COUNTY.

This county, on account of its dense population, has a County Board. We are indebted to it for obtaining local reports and for securing a filling out of schedules. We this year only give the names of the corresponding officers.

HUDSON COUNTY, *Clerk of Board,* E. J. ROONEY, *Jersey City.*

BAYONNE, - - - H. MORTIMER BRUSH, M. D.

HARRISON.

A committee of Council is the Health Board.

HOBOKEN.

JERSEY CITY.

Board of Police Commission is Health Board.

KEARNY, - - S. W. CLASON, Chairman, *Arlington.*

NORTH BERGEN, - - A. ENGELBRECHT, *Homestead.*

TOWN OF UNION, - FRED C. HANSEN, Clerk, *Town of Union.*

UNION TP., - - - - WM. H. SCHMIDT.

WEST HOBOKEN, WM. G. SMITH, Health Insp'r, *West Hoboken.*

WEEHAWKEN TP., - - F. W. SHEERWOOD, *Hoboken.*

HUNTERDON COUNTY.

EAST AMWELL, - - B. C. YOUNG, M. D., *Ringoes.*

The report notices prevalent health, except some malarial disease, which is not usual.

FRANKLIN, - - CHAS. M. TRIMMER, *Quakertown.*

HIGH BRIDGE, - - JAMES H. WALKER, *High Bridge.*

Since its organization the Board has carefully looked after the health conditions of the township.

HOLLAND, - - - DR. J. T. RIBBLE, *Milford.*

The report notices the malarial fevers of an unusually severe type have been generally prevalent along the Delaware, the whole length of the river border. Our reports show that this has been true along nearly the whole course of this river—more we believe, than in any previous year. We believe it not very difficult to find what causes have been in operation to impede its waters, to effect adjacent drainage and to accumulate vegetable matter preparatory to dry hot seasons and unusual alternations of water covering.

KINGWOOD, - - WM. R. READING, M. D., *Baptisttown.*

LAMBERTVILLE, - - - - GEO. H. LARISON, M. D.

The Report deplores the neglect of vaccination and presents the need of more authority for health boards.

LEBANON TP., - - - - W. V. PRALL, *Changewater.*

In one of our towns there have been several cases of malarial and typhoid fever this summer. The supposition is that the

cause of it was that the cisterns on which railroad laborers and others depend do not get cleaned as they should be.

RARITAN TP., - - - DAVID DUNHAM, *Flemington.*

READINGTON, - - - - JOHN V. BERKAW, *Stanton.*

TEWKSBURY, - - - M. L. MCCREA, *New Germantown.*

TOWN OF CLINTON, - - - S. VAN SYCKLE, *Clinton.*

UNION TP., - - - - W. STOCKTON, *Pattenburgh.*

WEST AMWELL, - - JOHN T. DRAKE, *Lambertville.*

MERCER COUNTY.

CHAMBERSBURG, - - - EDW. B. SKELLINGER, *Clerk.*

The majority of property-owners have a pit dug in the yard adjacent to their houses, over which (pit) a water-closet or out-house is placed. Pipes leading from the house carry all the refuse water from this source into the pit, and it often happens that the plumbing is so defective, or of such a cheap character, that the stench arising from the contents of the pit will find its way through the pipe back, and contaminate every cubic foot of atmosphere breathed by the inmates of such house. Malarial fevers are quite common this fall, as well as during the past summer, and as a practitioner of medicine it has fallen to my lot to see several cases of the most malignant type, the exciting cause of which I attributed, (in a large degree,) to defective drainage.

The sanitary expenses of this borough are wonderfully small, the appropriation ($30) this year being the largest sum ever devoted to that branch of public service.

EAST WINDSOR, - - - A. A. WRIGHT, *Hightstown.*

The population outside of Hightstown is 1000.

HIGHTSTOWN BOROUGH IN EAST WINDSOR TP., - -
W. W. SWETT, *Hightstown.*

Malarial fevers have prevailed to an extraordinary extent, the locality having been for many years entirely free from anything of the sort.

The pond lying to the east of the north portion of the borough is generally run quite low during the summer season, and is well supplied with the Yellow Pond Lily and much decayed vegetable matter. The sewage from the Peddie Institute added to this ought at least to deter people from using ice from this pond.

EWING TP., - - - - WM. H. COOLEY, *Trenton.*

At a subsequent meeting of the Board a petition was handed us to abate a nuisance known as Keeler's Mill Pond, said mill pond said to be the direct cause of a great deal of malaria. Twenty-three (23) families out of twenty-five (25) have suffered more or less all summer, all these families living on or near to this pond. The Board have taken the matter in hand, and have tried two or three means to have it removed, but have not yet succeeded. The fact of this disease being so prevalent all over the country has worked very much against us.

This township has also an effective sanitary association which is a good model for other towns and townships.

HAMILTON TP., - - JOSEPH H. WEST, *Hamilton Square.*

HOPEWELL TP., - - JOHN FLEMING, *Pennington.*

About the only epidemic that has prevailed since the Board has organized, has been malaria, which has been very bad, especially in the western part of the township along the Delaware.

LAWRENCE, - - JOHN P. SCUDDER, Lawrenceville.

PRINCETON BOROUGH, - WM. A. DURYEE, *Princeton.*

Our Board was chosen in early summer. It was scattered during our vacation period. A portion of the members, after a few weeks, declined to serve, and it is only within a few days (October 25,) that all the above members consented to serve. Still some good has been accomplished. Locations that need care are known; wells have been examined; some nuisances abated, and otherwise the Board now hopes to begin to do good work. The borough is districted, and committees appointed. It may be expected that we would include the college in this report, but so much has already been written—much true and much false—and the circumstances of the college sickness are so fully known to the officers of the State Board, that nothing further is said at present.

TRENTON, - J. D. WOOLVERTON, M. D., *President of Board.*

WASHINGTON TP., - JOSEPH HUTCHINSON, *Robbinsville.*

WEST WINDSOR, - JOSEPH H. GROVER, *Princeton Junction.*

There has been more malaria than usual. In this, and in very many of reports, the epizootic among horses is noticed. It is of interest, as showing how wide spread such an epidemic may be, and how independent of local influence in the fact of its existence. Also, as we compare it in severity with that of 1872–3, and compare climatic conditions, there is reason to believe that its mildness had much to do with weather conditions. There are some allusions to the fact that a mild influenza was at the same time prevalent among human kind.

MIDDLESEX COUNTY.

CRANBURY, - - - ABIJAH APPLEGATE, *Cranbury.*

EAST BRUNSWICK, - - RICHARD SERVISS, *South River.*

MONROE, - - CHAS. D. APPLEGATE, *Cranberry Station.*

NORTH BRUNSWICK, - JOHN W. BODINE, *Franklin Park.*

PISCATAWAY, - - - - NATHAN VARS, *Dunellen.*

The past year has been marked by an unusual amount of sickness. The extreme warmth of the winter of 1878-9, has had a marked effect upon the conditions of health of our township, and the inhabitants have been, as a consequence, exposed to a greater degree of sickness. Diseases caused by miasmatic influences have been more frequent than for many years. Intermittent and remittent fevers have been quite prevalent during the summer and fall, and a number of cases of typhoid fever, (which are rare indeed here,) have been observed.

In consequence of this miasmatic influence, other diseases seem to have partaken, to a certain extent, of the periodical character of intermittents, and the severe characteristics seem still to prevail.

These influences have been more general than local, although some local sources of disease have existed. I might mention, as such cause, our proximity to the mill pond at Bound Brook, which has had a very perceptible effect upon the health of our citizens residing in that immediate vicinity.

RARITAN, - - - - THEO. A. WOOD, *Metuchen.*

Public health has been generally good, except some malarial disease. The rate of mortality is less than for any year since the organization of the township. The Board of Health has done much to further the drainage of a brook through the village.

SAYERVILLE, - - - - E. E. HILLMAN, *Sayerville.*

SOUTH AMBOY, - - - A. APPLEGATE, *South Amboy.*

SOUTH BRUNSWICK, - - C. M. SLACK, M. D., *Dayton*

A typho-malarial fever accompanied by apthores sore mouth prevailed somewhat in the fall.

WOODBRIDGE, - - A. A. EDGAR, *Woodbridge.*

MONMOUTH COUNTY.

EATONTOWN, - - ABRAM T. METZER, *Eatontown.*

Malarial diseases have been unusually prevalent, assuming mostly an intermittent form. The only complaint of nuisance made to the Board was promptly attended to.

FREEHOLD TP., - - CHAS. F. RICHARDSON, *Freehold.*

Refuse and excreta are removed in a primitive way. Privies are located near the houses, and are cleansed when the owners or tenants please, except when complaint has been made to us, and we have ordered cleansing. Several complaints have been received which were investigated and remedied. * * A plan of sinks and odorless excavation should be adopted and enforced here. A careful meteorological summary accompanies the report.

HOWELL TP., - - - J. LUTZ, *Farmingdale.*

The township has always been remarkably free from malarial diseases.

MANALAPAN, - - JOHN VAN DOREN, *Manalpan.*

MATAWAN, - - - - - - BENJ. GRIGGS, *Matawan.*

Malarial fevers have prevailed this year to an extent before unknown in this township.

MILLSTONE TP., - - - PETER FORMAN, *Manalapan.*

NEPTUNE TP., - - - *Report from Ocean Grove,*
DR. HENRY MITCHELL, *Ocean Grove.*

To DR. E. M. HUNT, *Secretary State Board Health:*

In compliance with the requirement of Sec. 4, of "An act concerning the protection of the public health, and the record

of vital statistics relating thereto," approved March 11th, 1880, the Board of Health for the Borough of Asbury Park respectfully report:

The district over which this Board has supervision is located in Monmouth county, Neptune township. In form the territory of the borough is nearly a square. It is bordered on the north by Deal Lake, a tide-water inlet, about one hundred and fifty yards average width; on the west by the road bed of the Long Branch branch of the Central Railroad of New Jersey; on the south by Wesley Lake, and on the east by the Atlantic ocean. The ocean front is about one mile in length; the distance from the railroad to the sea is about three-fourths of a mile.

Ten years ago this district was literally a wilderness, being then covered by a dense growth of pine and oak, with an undergrowth of bushes through which a human being could scarcely pass unless aided by an ax.

At present the whole borough is laid out in streets, building-lots, parks, etc., and the permanent population, as shown by the recent census, is now sixteen hundred and forty (1640,) while the summer population, during the past season, reached fifteen thousand (15,000) during a period of three months.

The soil is sandy, with an underlying stratum of clay, about seven to fifteen feet beneath the surface. The clay bed is from three to seven feet in thickness, and is underlaid by a stratum of gravel. Below the gravel is another layer of clay, and the well pipes are driven through this second stratum.

The water taken from these wells has, thus far, been generally good, but several instances have come to our notice where wells have been contaminated, and a movement is now being made by the authorities to secure the introduction of water from a distant point. There appears good reason to expect that an abundant supply of pure water will be furnished to the people of the borough within the coming eight or nine months.

In contour the borough is nearly level, but there is sufficient unevenness of the surface to afford good drainage. There is a fall of four inches to one hundred feet from the railroad to the sea, and from the southern boundary to Deal Lake there is a fall of eight feet. Sewers have been laid (with ten inch tile) through First, Second, Third and Fourth avenues, and in Kingsly and Hick

streets, draining and taking sewage from about one-fourth or one-third of the most populous portion of the borough. A force of men is now at work extending the sewer system.

The streets are wide. All of the avenues leading to the sea are 100 feet wide, increasing to 200 feet toward the shore.

The parks in the borough are numerous, though but two of them are of large size, as the accompanying map will show.

The buildings are, for the most part, light frame structures, with ample piazzas, intended for summer occupation only, though within the last two years a better built and more permanent class of dwellings has been erected.

There is no difficulty in making good cellars in almost all parts of the town, and considerable care is manifested on the part of owners to promote health by cementing cellar bottoms, and also in ventilating incline spaces over unexcavated ground under dwellings.

The usual size of building lots is 50x150 feet, affording opportunity for free circulation of air.

Kerosene oil is chiefly used for obtaining artificial light, though the public buildings are generally lighted by gas, manufactured on the premises from gasoline.

Garbage and other house-refuse is collected daily by the borough carts, and deposited outside the corporation limits. This service was performed very satisfactorily during the past summer, few complaints of neglect having been received.

Privies are made in accordance with a borough ordinance which requires them to be made of brick—bottom and sides—and to be cemented on the inside and made water-tight. They are excavated by the odorless excavator.

There are no slaughter-houses nor any hog-pens within the borough.

The public school building is a large and fine edifice, erected three years ago at a cost of ten thousand dollars, exclusive of the ground. It has accommodation for five hundred pupils. The present attendance is about three hundred.

The only prison in the borough is the police station. It is kept scrupulously clean, and is suitable for the purpose for which it is used.

A new steam fire engine was recently purchased. This ap-

atus, together with several carbonic acid fire extinguishers, ms to afford sufficient protection against fire.
There is no cemetery nor burial place within the borough.
The public health has been good during the past year. No demic, nor any prevailing disease has existed. Not a single e of typhoid fever has occurred here, to our knowledge, ring the past year.
So far as we can learn, this locality is exempt from malarial luence. No form of malarial disease has ever been prevalent e, and we believe no case of intermittent fever has originated e. Intermittents and malarial neuralgias which are brought e yield readily to treatment. The Health Board has an pector.

REWSBURY TP., - - W. A. SICKLER, *Red Bank.*

D BANK, (in the township), - H. J. CHILD, *Red Bank.*

Refuse is removed from vaults by a steam pump with tight rels. The primary departments of schools are overcrowded. e Board, since its organization, has had sixteen complaints l served twenty-six notices. Through the request of the ard, some of the gutters have been flagged.

PER FREEHOLD TP., - - WM. ROBBINS, *Allentown.*

Allentown has special drainage in one street and first-class ool provisions.

NASQUAN, - - - - A. A. HIGGINS.

We have held several meetings but very few matters have en presented to us, excepting abatement of nuisances, in which r cases, the people have generally acquiesced in the suggesns of the Board. In this vicinity (on the ocean) there has en but one case of drowning, and in that no opportunity was orded of applying means of resuscitation, as suggested by the ate Board. There is an epidemic of diphtheria prevailing ar Sea Plain, in this township, and at Ocean Beach, on south le of *Stark River. Cannot* account for it, except it be the

general prevalence of the disease at this season. Those attacked near Sea Plain live on the edge of a bog, which has been drained, and the water drank by them is principally surface water. There have been no other epidemics in this township during the year.

MORRIS COUNTY.

BOONTON, - - - - - C. H. SIMONS, M. D.

TOWN OF BOONTON, - J. G. RYERSON, M. D., *Boonton.*

CHATHAM TP., - - MOSES M. OSBORN, *Madison.*

CHESTER TP., - - - W. A. GREEN, M. D., *Chester.*

No epidemics have visited us during the past year, though in the spring months we had a goodly number of cases of diphtherite or diphtheria—for I regard them as one and the same, differing only in severity. We had also quite a number of cases of scarlatina of the mildest possible type, and in only three instances did anginose symptoms develop themselves to alarming extent. In one case we had nephritis as a complication, followed by anasarca. During the summer, we had comparatively few cases of cholera infantum. What few there were, with but a single exception, terminated in recovery; this was in an infant six months old. Ordinary diarrhœas were frequently met with and offered but little resistance to the ordinary methods of treatment. No well pronounced cases of dysentery occurred until the latter part of August, and this was of the variety known as bilious or malarial. It followed the course of Black river, near the swamp, all the way from Ironton to Hackleburne. All the cases recovered, and but little difficulty was experienced in bringing about convalescence. Fever of a malarial character has prevailed to no small degree; and in almost every disease that comes under our observation, we can discover a disposition to a paroxysmal exacerbation at some one time in the

-four hours; this is generally controlled by a few doses of
r some one of its alkaloids. This condition of affairs has
more and more apparent for the last three or four years,
o which time we scarce ever had occasion to administer
s an anti-periodic. When it first began to develop itself,
buted it in part to the unworked mines, (for at that time
ines were abandoned, owing to the general panic) and
to the malarial wave, that seemed to be passing over a
ortion of the country; perhaps both played an important
When the mines were re-opened, last spring, the trouble
l to augment, probably owing to the filth that was taken
om. Almost all cases of fever follow the several water-
, or near them; on the hills we have a more varied class
ases to contend with, mostly inflammatory in type. A great
of trouble is experienced in the Hackleburne district, in
ling certain diseases, particularly those of the bowels.
s accounted for by the location and surroundings: some
r fifteen houses, closely built together, occupied by miners,
families are anything but neat in person or cleanly as
s the premises; all kitchen slops and waste, and very often
er slops, too, are thrown in front of the door; the privies
l and above the houses, the water made foul by drainage,
e air impure by the water in the river and the uncared for
ns and pig-stys, all go toward rendering the locality one
most unhealthy in the township. Much has been said
reats made about the place, but to no purpose, and the
ing left to do is to exercise the authority which is invested
Board.

RSON, - - - SILAS & ROWLAND, *Milton.*

IAM, - - - JOHN R. PITNEY, *Mendham.*

ILLE, - - - JOHN BLOWERS, *Montville.*

S, - - - COLLINS WIER, *Morristown.*

STOWN, - - CHARLES H. GREEN, Morristown.

MT. OLIVE, - - - - ENOS G. BUDD.

The reports notice the excellent natural water-supply and the healthy character of the locality.

PASSAIC, - - OSCAR LINDSLEY, *Green Village*

The township includes the Great Swamp, consisting of about seven thousand acres. The health of the township has been good the past year.

PEQUANNACK, - - E. W. MARTIN, *Pompton Plains.*

The habit, when numbering the school district, of inquiring if the children are vaccinated, is a good one.

RANDOLPH TP.,

DOVER TP., - - - - WM. H. LAMBERT, *Dover.*

The town is on the Rockaway river and well supplied with water. The poor are few and are taken care of by the township.

ROCKAWAY, - - - - - E. B. MOTT, *Rockaway.*

Malarial fevers are prevalent along the Rockaway river in summer, probably caused by the diversion of its water from its natural channel for canal or other purposes.

ROXBURY, - - - - J. T. LAWRENCE, *McCainesville.*

There has been considerable sickness from malarial fever. The Morris Canal has, of late, been quite thoroughly dredged, and the muck was thrown upon its banks and most of it has remained there. One case of nuisance was abated by the Board.

WASHINGTON TP. - - - B. LARUE, *Waughrightville.*

OCEAN COUNTY.

BERKLEY TP., - - - - C. F. BONNELL, *Bayville.*

JACKSON, - - - - THOMAS P. BISHOP, *Cassville.*

The assessor reports the district as always exempt from fevers.

LACY TP., - - THOS. C. VANARSDALE, *Cedar Creek.*

No ponds or stagnant water are to be found in any part of the township. There are no malarial fevers and deaths seldom occur.

PLUMSTEAD, - - - A. S. BROWN, *New Egypt.*

The description of the township, especially of New Egypt, is that of a healthy section. The pines extend upon the south, and these, and the excellent water-supply, seem to promote the good health of the locality. The water from the cedar swamps seems to be purer than the usual surface water.

PASSAIC COUNTY.

ACQUACKANONK TP., - - NICHOLAS FREDERICK, *Passaic.*

MANCHESTER TP., - - MR. DE GRAY, *Hawthorn.*

Chills and fever and remittent fever have been prevalent this year.

PASSAIC, - - - - JAMES A. NORTON, *Passaic.*

PATERSON, - - CHAS. F. W. MYERS, M. D., *Paterson.*

In addition to report are sent valuable specimens of various blanks used.

POMPTON, - - - CORNELIUS TOWNSEND, *Wanaque.*

Burial grounds are mostly connected with churches. The question may be properly raised whether churches that are closely crowded upon by graves or not occupied during the week, do not become the receptacles of grave-yard air, and so risk the health of those who assemble on the Sabbath. Since it has become more common to have basements, or to have furnaces in small cellars under the building, there is more risk of an inflow of air laden with organic matter.

WAYNE TP., - - - - DAVID BENSON, *Paterson.*

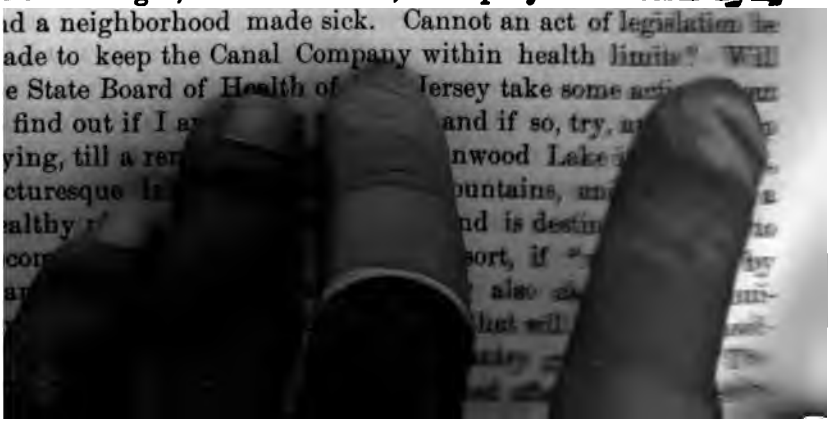
There has been a good deal of malarial fever for the last two years. The effect of various feeds on cattle as producing disease is noticed. Corn meal, from which the sugar has been extracted, has somewhat taken the place of brewery grains. Aborting among cows is not now so common; this is an evil much complained of by farmers; it is an important inquiry whether diseased rye or other grains do not cause it.

WEST MILFORD, - - - A. S. TERHUNE, *West Milford.*

We quote from a letter appended by one of the physicians of the township.

During the past spring and summer there has been some dysentery, cholera morbus, &c., among the adults, and cholera infantum among children, but not in a fatal form. But the great affliction, or *curse*, if properly named, in West Milford and its environs, is malaria or chills and fever, intermittent fever, &c. It seems to be growing each year, increasing in area and assuming different types and shapes. There has been a number of cases of typhoid fever of a malarial type during the past two or three months, and some of them about sick enough to die, still I have heard of but one fatal case. What causes this malaria I am not entirely able to say, to my satisfaction, and I am quite sure I can't explain it to the satisfaction of all; I do not think it is caused by the badness of the people in West Milford. It is now *prevalent* to an alarming extent. Quinine cinchonidia, or some *other* antiperiodic, is a regular dessert for breakfast, dinner and

.pper. Malaria around here enters into nearly every disease or mplaint I have to deal with, even to child-bed, and I can't get rough any of them without the use of quinine. I have been this place over thirteen years, and for the first five years ırdly a case of chills and fever was known any where around, ıt about eight years ago, when the Greenwood Lake and Mont-air Railroad was commenced, intermittent fever, in its various rms, began; I ascribed it to the excessive throwing up of fresh .rth, with its millions of little roots, &c., of vegetable matter tting and decomposing, and throwing off a poisonous gas or agrance of some kind. But eight years have past, and still the ıills and fever, or malaria, is on the increase, and in parts the community where the natural drainage is good, no swamps marshes, and genuine mountain air, seemingly healthy and vigorating. The water in Greenwood Lake is very low, at esent, owing to the fact that the Morris Canal Company has it ıder control, to a great extent, and can draw of the water to it their convenience. A great quantity of vegetable matter is ft to decompose, and the result is just what you can expect, a athsome, disgustings mell all along the border of the pond, an lious gas of some kind or other, perhaps, or a malarial breeder. his, of course, is not at all times of the year, but it is so now, ıd seems to be the case whenever the Canal Company chooses raise the water below the average water-mark. If nature had en let alone here, and not been tampered with by art, my im-ession is that malaria would hardly have been known around reenwood Lake. The lake has been made larger by nearly two iles in length, land overflowed, a company made richer by it,


ıd a neighborhood made sick. Cannot an act of legislation be
ade to keep the Canal Company within health limits? Will
e State Board of Health of Jersey take some action
find out if I am and if so, try, and
ying, till a rem nwood Lake is
cturesque la ountains, and
althy re nd is destined
cor ort, if
ar also

&c., and are allowed to become filled to the top of the ground with the excretions; no disinfectants, such as dry earth, coal dust, out of coal pit bottoms, are used, and the consequence is that a foul stench is emitted, disgusting and loathsome in every way. I believe that a privy, as a general thing, should be kept just as clean and sweet, to the eye and nose, as the teeth should be kept clean to preserve a good breath. I believe these bad kept privies of our country schools have a demoralizing effect on the children. Would it not be well for the Board of Health to tell the County Superintendents to speak to the teachers about this thing, when they are calling round among the schools under their charge? It wouldn't hurt our teachers, up this way, one bit, to have their County Superintendents ask if charcoal was made around here.

Another great nuisance in some parts of the country is the grave-yard, or burying-ground; such a one we have in the village of West Milford, in the shape of a grave-yard; this grave-yard is in the centre of the village, and on the elevated side of the street. The church is in the grave-yard. Private dwelling houses are situated on the lower side, or other side of the street. Each house has a well of water for family use, cooking and drinking purposes. What I mean is this, the water runs from the grave-yard in these wells, without doubt. I have heard one old sexton of this church tell me a number of times, that when graves were dug in certain parts of the yard, the wells of water would become roiled and muddled during the process of digging the graves. The children of the Sunday School drink out of these wells, and the children of the public school in the place patronize them, as the school has no well of its own, and if it had, the school-house is situated at the lower end of the grave-yard. This grave-yard is a confirmed nuisance; it is an old yard and the community still bury in it; the land is wet and soggy in the yard. There are a number of good locations within a quarter to a half mile from the village for a cemetery or grave-yard—soil dry and pleasant. I urge strongly on the State Board of Health, that the matter be looked into, and, if I am correct, that an act in the Legislature be passed preventing any more burials taking place in this grave-yard.

SALEM COUNTY.

LOWER ALLOWAY'S CREEK, W. B. RIDGWAY, *Hancock's Bridge.*

LOWER PENN'S NECK, - - WM. NEWELL, *Pennsville.*

QUINTON, - - - A. G. MCPHERSON, *Quinton.*

SALEM CITY, - - - - J. D. FERRELL, *Salem.*

Its Board of Health was late in organization, but is now fully organized.

UPPER PENN'S NECK, - - GEO. W. HEWITT, *Pennsgrove.*

Three other townships have Boards of Health, but have made no special report. The health of the county seems to have been remarkably good.

SOMERSET COUNTY.

BEDMINSTER, - - - WM. P. SUTPHEN, *Bedminster.*

A fever of remitting, intermitting and typhoid types has prevailed in the southern central portion of the township for a period of three months. The clearing of timber from a tract of land embracing about seventy acres has been in progress about four years; a portion of the timber was manufactured into charcoal, while much more was permitted to decay on the ground. During the coaling, the neighborhood was clear of fever; after that ceased, fever commenced in the vicinity, and upon the high lands adjacent. The land was low, in spots marshy from blind springs, and the soil a clay subsoil. During the latter part of the month of September, in 1880, the village of Pluckamin suffered from fever to a degree approaching an epidemic. Due notice having been given, the Board visited the village officially, on the fifth day of October. The sewerage, cellar drainage, condition of wells, cisterns, cesspools and privies were examined,

taking one day's research. Cases were found that demanded prompt action. Property owners were at once notified, requiring sewerage, cleansing of wells, cellars, privies, &c. In every instance, the Board are pleased to say, that their demands were complied with, and a general cleaning of the town was the result. Up to the date of this report no deaths have occurred in that vicinity from fever, and its force appears exhausted, as but few new cases in that vicinity are reported.

BRANCHBURG TP., - - A. J. AUTER, *North Branch.*

BRIDGEWATER TP., - - WM. J. POTTER, *Somerville.*

Chills and fever, or malarial fever, has prevailed in Bound Brook, so that scarcely a person in the village or vicinity has escaped. The Board of Health was called there in July last, to examine the condition of the mill-pond adjacent, and other places, to ascertain the cause of the unusual sickness. The Board met several times at the request of the citizens, and heard testimony in regard to the matter, and finally declared the mill-pond and dam a fruitful source of the disease seriously affecting the health and endangering the lives of the inhabitants of that vicinity, adjudged it a nuisance, and ordered the owners to abate and remove the said nuisance between the first and tenth of November; and that in case of failure to do so, the Board would proceed to remove the same, and charge the expense thereof on the lands. The parties had been previously indicted by the grand jury, and the case was tried in the courts before this time expired, the owners enjoined, and the court ordered them to abate the nuisance. They immediately removed the same by taking it all out to the foundation, and are preparing to drain the pond by making a channel through the central part with lateral drains on either side.

FRANKLIN TP., - - D. J. VOORHEES, *East Millstone.*

Malarial fevers prevailed to some extent. The Board took *measures* to secure full returns of vital statistics.

HILLSBOROUGH, - - - DR. C. R. P. FISHER, *Neshanic.*

MONTGOMERY, - - - WM. OPPIE, *Harlinger.*

Some cases of malarial fever are reported.

NORTH PLAINFIELD, - - ISAAC BROKARV, *Plainfield.*

It is claimed that the death rate is increased by the temporary residence of invalids.

WARREN TP., - - - GEO. TERRELL, *Warrenville.*

SUSSEX COUNTY.

ANDOVER, - - - - - G. C. COOK, *Andover.*

The great neglect of vaccination is noticed.

BYRON, - - C. K. DAVIDSON, M. D., *Starhope.*

Malarial affections prevail in the southern portions of the township.

FRANKFORD, - - EDWARD ROE, ASSESSOR, *Branchville.*

Land drainage is common and the water-supply good. Among animal diseases, foot-rot is noted as prevalent.

HARDYSTON, - - JESSE DENNIS, *Franklin Furnace.*

Malarial diseases were very prevalent during the summer and fall. Water is supplied from the Wallkill and Pequannock rivers and their branches, which are sluggish. Some of the tenement houses of operatives are in bad condition.

NEWTON, - - - - GEO. HENDEN, *Newton.*

Meteorological Tables are carefully kept at the Newton Library by Dr. Ryerson under the direction of the State Board, and will serve *to indicate the climate* of this portion of the State.

SANDYSTON, - - - WARREN VAN SICKLE, *Layton.*

Scarlatina as an endemic existed to quite an extent last winter and in the early spring. During the summer and early fall, intermittent fevers were quite prevalent, caused, no doubt, by the extreme dry weather exposing decomposing vegetable matter.

SPARTA, - - - E. R. POTTER, M. D., *Ogdensburg.*

STILLWATER, - - - C. O. MOORE, M. D., *Stillwater.*

Malarial fevers, of the intermittent type, have been prevalent with quite a number of cases (mostly sporadic) of typhoid and typho-malarial fever.

VERNON TP., - - - CARLOS ALLEN, M. D., *Vernon.*

The Black Creek runs through the valley having extensive drained lands on either side. From these lands or from some other cause, unknown, there has been much malarial disease in the township of late years.

Drainage of wet lands (in other parts) has been effected to a great extent by owners, for agricultural purposes, which checked intermittents in the locality very much. A disease known as "Black Leg" has been reported among calves but is not contagious.

WANTAGE, - - - W. S. VONDERHOFF, *Deckertown.*

Malarial fever and ague have been common in the low lands along the Wallkill and to some extent throughout the township, induced, in my opinion, by long continued dry weather. In ordinary seasons it is unknown.

Abortion, or premature delivery of calves, causes great loss to our dairies.

UNION COUNTY.

CLARK TP. - - - - - - W. H. COLES, *Rahway.*

Printed before as a sample of a brief summary.

ELIZABETH, - - - - - PETER BONNETT, *Elizabeth.*

The city has a Health Inspector.

C. The water supply is abundant, and is drawn from the Elizabeth River, about a mile and a half from the populous part of the city. The Water Company's pipes are extended over a large part of the city. In other sections, good water is obtained from wells. Some complaint is made during the summer season of smell and discoloration in the city water. This is probably due to vegetable matter in the reservoir, and is a common annoyance in many places.

D. The sewer system is extensive and, in most parts of the city, in advance of the needs of the inhabitants. The only real defect is the use of the Elizabeth River as a drainage outlet, which in consequence becomes very foul and offensive and cannot, in that condition, fail to be detrimental to health.

FANNWOOD, - DR. F. W. WESCOTT, M. D, *Scotch Plains.*

LINDEN, - - - - - C. J. BROWN, M. D., *Linden.*

Reference is made to the pollution and stench from Peach brook, which is substantiated by many persons, and seems to require the action of the Board.

NEW PROVIDENCE, - - JOHN WOOD, *New Providence.*

The Board reports some special investigations in the township.

PLAINFIELD, - - - H. H. LOWRIE, M. D.

The excavations known as the Gravel pits, which have been supposed to be the cause of disease for some years, have at last been filled and rendered perfectly healthy. Another source of complaint is a mill-pond, bounding the city on the west, which we hope to have remedied.

RAHWAY, - - - LEWIS S. HYER, *Rahway.*

The assessors take record of all not vaccinated. Some of the

physicians are dilatory in sending in returns of births. The introduction of water on the high pressure system does away with the necessity for fire engines.

SPRINGFIELD, - NICHOLAS C. JOBS, M. D., *Springfield.*

The diseases that prevail during the summer and winter are alike complicated with malarial poison so much that many yield alone to quinine, as, for instance, a bronchitis gets well under the influence of the bark better than when expectorants are relied upon. There have been only a few cases of scarlatina, and those of a mild type; a few of diphtheria; a lesser number of dysentery than in former years, while of the malarial forms, there have been frequent types of bilious or remittent, typho-malarial and congestive fevers. The pulmonary diseases, especially the forms of phthisis, are greatly aggravated and hastened in their course by the periodic and high fevers which the patients have, and which do not scarcely yield at all to any of the anti-febrile remedies. Those that ordinarily relieve the night-sweats do not have any effect unless combined with quinine. The public school is in good condition as regards the heating and ventilation. Were it not for "malaria," the people would be healthy, happy and prosperous.

SUMMIT, - - GEORGE W. NICHOLAS, *Summit.*

Malarial fevers of the intermittent form are slightly prevalent on the low lands. Hope to check the disease by enforcing sanitary regulations.

Evils have been arrested and the community has been awakened to the importance of guarding against disease by cleanliness both of person and dwellings.

UNION TP., - - - - JOHN LEONARD, *Union.*

Malarial fevers have been prevalent in many parts of the township.

The credit given in this report to the State Board for stamping out pleuro-pneumonia, depended much upon the efficient co-operation of the local Board of Health and of owners of *cattle.*

The extreme lowness of all streams during the summer is

noted. An effort has been made to convert a portion of the "Turf Meadows" near Connecticut Farms into a lake, but only a little progress has yet been made.

WESTFIELD, - - - - - JOHN M. C. MARSH.

The efficient action of the Board was important in checking small-pox in one locality.

WARREN COUNTY.

ALLAMUCHY, - - - - WM. SEALES, *Hackettstown.*

FRANKLIN, - - P. S. CLEVELING, M. D., *Broadway.*

General health good, but fowl and hog cholera have occasioned considerable loss of stock.

FRELINGHUYSEN TP., - T. RORBACH, M. D., *Johnsonbury.*

There has been unusual exemption from intermittent, remittent and other fevers.

GREENWICH, - - - S. W. WEIDER, *Reiglesville.*

The general health has been good. The losses from hog cholera are from five hundred to one thousand dollars.

HARDWICK, - - - J. S. VOSS, *Marlsboro.*

HARMONY, - - - I. K. VANNATTA, *Harmony.*

There are seven school-houses in the township, only one of which is a good one. Two are in cemeteries, and it is worthy of inquiry, whether such a locality is good. Cholera has largely prevailed among swine. It has been noticeable that farmers who lived on the hills were exempt.

KNOWLTON, - - - LEWIS C. WELLER, Columbia.

LOPATCONG, - - - - J. YIESLEY, *Phillipsburg.*

PHILLIPSBURG, - - - - J. P. SWEENY, *Phillipsburg.*

The Board of Health has found some difficulty in its work, but has pushed forward without fear or favor.

TOWN OF WASHINGTON, - WM. BAIRD, M. D., *Washington.*

Possibly one, if not the most important sanitary subject in our town, is the question of sewerage. Our town is particularly free from typhoid diseases and so called zymotic affections, whether this is due to the general use of cistern-water I am unable to say, but with good sewerage there is no reason why this town should not remain with a very small death rate. We are badly situated for getting a water-supply through pipes, and so cisterns will no doubt be used for a long time, or until the town increases materially in wealth and size. This fact, taken with its present size, makes the town well adapted to the earth closet system, and I believe if our townspeople were instructed through the State Board, or by pamphlets, as to the importance of this system, that dry earth and removals at regular intervals would take the place of foul vaults and cleansing every 4 or 5 years. The health of our town is not materially effected by these things as yet, but it is our duty to keep it in its present healthy state.

WASHINGTON TP., - - WM. C. CAMPBELL, *Washington.*

The reports include many more items of local and industrial interest, and as placed on file, will afford important reference as to most of the localities in the State. The faithfulness of observations and the general ability shown in these returns vindicate the present construction of our Health Boards. While there are some township officers who are not fully awake to the importance of this oversight of health, it is because they have not yet had time to become intelligent as to existing needs. Each year will increase local attention, except in those rare instances where there is opposition to all progress.

SUGGESTIONS TO HEALTH BOARDS.

In addition to other directions, to be found in this and other yearly reports of the State Board, it may be added:—

I. Let each Township Committee at its usual meetings, when the assessor is present, sit also as a Health Board and enter the fact in the township health book, together with any item of business.

II. Whenever new officers are elected, there should at the first meeting be an entry in the health book of the names of the Health Board as thus made.

III. Where there is no township physician as a member of the Board, some of the Boards have invited some adjoining physician to act as their adviser.

IV. Carefully examine all laws relating to the construction of local Boards and their duties. Correctness and promptness of action are most important. The failure of a law is oftener in delay or mistakes in its administration, or in technical errors than in the defects of the law.

V. The reports of the State Board of Health as sent are not the property of individuals but of the Board. The keeper of the town health book should keep control over them and see that when loaned to others they are returned to him, and passed over into the hands of the succeeding officer.

VI. We ask the same promptness in future annual reports as in these, and that the few who have failed to organize, or to make full report, will fully arrange at the first meeting of the Township Committee, and notify us.

VII. As the returns of marriages, births and deaths, so much indicate the progress and health of communities, and are essential in the study of local conditions, all Boards should insist upon prompt returns, and report to the Secretary of State any omissions. It is, too, the legal right of every citizen to have such a record. Any neglecting returns are liable to suit at law.

VIII. All communications should be addressed "State Board of Health," or "Bureau of State Vital Statistics," State House, Trenton.

TYPHUS FEVER.

ıIEF MEMORANDUM OF TYPHUS FEVER AS NOW PREVAILING IN CAMDEN COUNTY ALMS-HOUSE.

)out the middle of January, after the Report of the Secretary gone to press, a request was received by the Secretary of the d from a Freeholder Committee of Camden county and from)hysicians of the Alms-house, that the Board would give ıtion to a fever prevailing at that institution which had .dy caused sixteen deaths, but the character of which was yet fully certified. Our first visit was made January 17th, a preliminary report the day after. We abstract from that rt as follows:

:tween November 24 and the date of my visit, there had about fifty cases of fever, with symptoms very distinct from ttent, and not having the usual symptons of typhoid fever. sought the history of the first ten or twelve cases that had rred. The first patient was living, and was able to give an ligent account of himself immediately previous to his k. He had been working during the summer at Ellisburg. ıt the fourth or fifth of November, he went to Philadelphia, e he remained about a week, with very indifferent self-care. odged in two mens' lodging houses, which he describes as of lowest kind; the crowded rooms were occupied by about ty others, and a few days after his return home, he became nd was brought in a semi-unconscious condition to the alms-e, November 24th, and placed in a small room about 12x12 three other persons in it. On December 6th, one of his ı-mates was taken sick with the same fever, and the other soon after. In the next room on the left, occupied by two per-, both were taken sick. Cases soon followed in the two rooms he opposite side, across an eight feet hall. The first ten or ve cases were just in this section. In the two rooms adja-, and the three rooms opposite very few escaped. Three of)atients, one of the nurses and some others were able to give erous facts as to the progress of the disease. The disease had r showed itself in the women's department of the same build-

Taking all these facts and some others, as well as the charac-

ter of the fever into consideration, it seems very probable that the occasion of the sickness was the introduction of a contagious disease in the person of the first patient. It was, however, important to examine into other possible sources, or to see whether a fever that had been thus introduced was rendered unusually severe by bad household or local condition. The details as to the examination of water-supply, sewer system, and all sanitary construction, will be given hereafter.

The great defect that at once expresses itself is that of over-crowding. In November and December, the new part not having been in full occupancy, and the number of inmates being greatly increased, there was also an increase of crowding. We found seventy men in two adjacent rooms, 20x80 and 20x70, respectively. The closeness of beds in dormitories and rooms is still worse. Those who are sick are now crowded into entirely too small spaces, and the nurse force is wholly insufficient. While the physicians are doing everything in their power, it is to be feared that the high rate of mortality will not be avoided, and occurrences of new cases prevented until a system is adopted just the same as is in operation in our best hospitals. There is danger that the disease may spread into the adjacent district, unless the greatest precautions are taken, or that the whole institution may become so infected, as to repeat the experience of some others which have continued to have new outbreaks from the old virus, through successive seasons. While more details will be given in the full report when made to the State Board of Health, it seems proper that in view of the present emergency this preliminary statement should be made.

Respectfully,

EZRA M. HUNT,
Secretary of State Board of Health.

Continued correspondence urged the rapid adoption of a hospital and separative system. On account of imperfect discipline and doubts as to exercise of authority, some delay occurred. At my next visit I was accompanied by Prof. C. F. Brackett, President of the Board, and Dr. F. Gauntt, member of the Board from Burlington County. We all earnestly insisted that the fever was of so serious a character as to be regarded as a pest which might easily be extended through the adjoining district. The Freeholders were advised to give to the physicians full power of stewardship, and to perfect a system of quarantine by which all well patients after fourteen days could be removed. The rate of mortality had decreased after a little relief of the over-crowding and the use of disinfectants. To this date there have been about seventy cases and twenty-five deaths.

Post-mortems advised by the Board and conducted by Prof. Tyson, of Philadelphia, as also other examinations of specimens by Prof. Pepper, leave no doubt that the disease is typhus fever. *Our report next year* will contain fuller details of cases as also of a thorough examination into local conditions.

It seems a coincidence that remittent fever at Bound Brook, typhoid at Princeton, and typhus in Camden county, should have in one year furnished such wonderful fields for typical study, while small-pox as a contagious disease which can be prevented has also had too much sway. The occasion for a close investigation of preventible diseases seems thus greatly impressed upon us, while other still more common zymotic diseases invite our constant attention and care. These whole series of cases have fully impressed upon us the importance of preventing such outbreaks and the need of prompt sanitary methods in their abatement.

SUBSOIL DRAINAGE.

THE SANITARY REQUIREMENTS OF SUBSOIL DRAINAGE OF THE SITES OF TOWNS AND CITIES.

BY ASHBEL WELCH, C. E.

All we have to say rests on the proposition that *wet soil is unvorable to health.* As this will hardly be disputed, we shall not tempt to prove it, but merely enumerate some of the injurious fects of wet soil.

In hot weather the moisture from it facilitates the develop-ent of disease germs or specific poisons, whatever disease germs specific poisons may be, and also their transport from place to ace. That moisture facilitates the evolution of deleterious ises. Even where there is nothing to decompose, it causes an jurious excess of vapor. In cold weather the evaporation from mp soil uses up some of the needed heat, making the ground, some cases, ten degrees colder than it is found to be after ing drained.

Dampness also makes the human body more sensitive both to at and cold. In the dry climate of Minnesota many degrees low zero are quite bearable; on the other hand, we all have felt temperature of eighty degrees harder to bear on a damp day, an one of ninety degrees is on a dry day. Breathing an mosphere of vapor by skin and lungs, instead of all air, or arly all air, has a depressing effect, tending to produce disease, predispose to it. One reason why mountain air is so invigor-ing is that at night the atmosphere of vapor is tenuous in com-rison with the air, and so we breathe more air and less vapor. he depressing effect of hot weather, and the invigorating effect cold weather, are probably due more to the greater or less nount of vapor than to the direct effects of heat or cold.

Under some conditions, a wet soil helps to produce one great

class of diseases, such as malarious, and to spread and intensify the zymotic; under other conditions, it produces another great class, such as rheumatism and coughs and consumption.

Doubtless the recent wide extension of the practice of excessive watering of streets in hot weather, is one cause of the increased sickliness of many places, and especially of the spread of malaria to places where it never prevailed before. This comes not only from the moisture, but from the fumes of the street filth, which the moisture assists to solve. The evil is intensified by the excessive foliage in some places, especially close around dwellings. Some persons, perhaps many, on reaching a watered street on a hot day, are unmistakably sensible of its depressing effect. Dust is bad, but dampness and malaria are worse.

The driest countries in the world, such as Egypt and Algeria are the healthiest, except when the heat is excessive; and these far healthier than damp countries equally hot.

Offices in basements, and dwellings of the poor in cellars, even at Liverpool, are notoriously unhealthy. Cellar kitchens are saved from unhealthiness by their open fires.

As there is everywhere an atmosphere of at least very tenuous vapor, some amount of it is doubtless necessary to health and comfort. It is therefore conceivable that a place may be too dry. But it is not likely that a place will ever be found or made too dry in this country.

It may be said that the air in a hot stove room becomes so dry as to produce headache; and that in hot weather the moist air around a playing fountain is refreshing. The headache comes from other causes. The coolness produced by the evaporation of spouting water is refreshing to most persons, in spite of the increased moisture, but to some the depression from the moisture more than counterbalances the coolness.

In 1862 Dr. Henry L. Bowditch, of Boston, read a paper on the connection between moisture and consumption, before the Medical Society of Massachusetts, showing the comparison, after several years of observation and inquiry, of one hundred and eighty-three townships in that State, and also of many single localities and dwellings. He found that in the one hundred and twenty-eight localities where moisture prevailed, consumption prevailed in one hundred and thirteen, and was rare in fifteen and that in the sixty-two townships where dryness pre-

vailed, consumption prevailed in twelve, and rare in fifty. That is, it prevailed in eighty-eight per cent. of the wet localities. and in less than twenty per cent. of the dry.

Much the same result was afterwards independently arrived at by Dr. Buchanan in 1866. After a wide and cautious induction from examination of localities in the three southeastern counties of England, he sums up as follows: "Wetness of soil is a cause of phthisis to the population living upon it." His facts would justify a much stronger statement.

The Registrar General of Scotland, in his seventh annual report made about a dozen years ago, speaking of Dr. Bowditch's conclusions, says in confirmation, that in five of the largest towns in Scotland consumption is most rare where the soil is driest, and little more than half as frequent in the very driest as in the very wettest.

As we should expect from what has been said it has been found that impervious and retentive soils (undrained) are more unhealthy than porous soils; that flat ground and that in which there are undrained hollows are more unhealthy than sloping ground of the same materials; and that glacial drift, being less pervious, and having more isolated hollows, is likely to be more unhealthy than diluvial gravel or sand.

It does not necessarily follow from what we have said that the proximity of streams or ponds, if the water is pure, is specially injurious to health. The evaporation from wet soil is continually forming and keeping up an atmosphere of vapor of considerable density immediately around us, that from neighboring waters being diffused, becomes more tenuous before it reaches us. The vapor from subsoil water brings up impurities from the ground into our very presence, while that from pure water does not. Evaporation from the ground chills it under our very feet; that from streams cools only the water and the air at some distance. But more than all, when the ground is dry the air circulates in it, and neutralizes its impurities.

So, in the somewhat analogous care of houses, damp from recent contruction, it is well known that they are unhealthy and depressing, predisposing to diseases of the lungs, rheumatism and epidemics.

Probably no one will question the fact that a site, naturally wet, is made more healthy by being well drained. But the extent

of the improvement in health by drying the soil, is probably appreciated by but few.

In 1867, Dr. Buchanan made for the Privy Council of Great Britain, a detailed report of the sanitary improvements that had been made in twenty-four towns in England, or cities as we would call them, and of the death rates before and after those improvements were made. Among the many particular effects of the improvements which he points out in each of these towns, one is the drying produced by the improvements. In a little less than one-third of the cases he reports "much drying," in a little over one-third of the cases, "some drying," and in the remaining third "little or no drying," or some equivalent statement. The following table, compiled from his statements, shows the decrease after the improvements were made, of the general death rate, excluding deaths from cholera during these epidemics, the consumption death rate and the typhoid fever death rate. We have grouped the towns according to the amount of drying. Dr. Buchanan recognizes the beneficial effect of drying, especially in consumption, but he does not seem to have seen what this table shows, the great extent to which the decrease of death rate was owing to it.

From Dr. Buchanan's report: Decrease in death rate, excluding epidemic cholera, after sanitary improvements made about 1855.

Column 1, name of town; 2, amount of drying; 3, deaths in 10,000 before improvements; 4, deaths in 10,000 after improvements; 5, per cent. of decrease from all causes but cholera; 6, per cent. of decrease from all causes but phthisis; 7, per cent. of decrease from all causes but typhus; 8, from cholera.

1	2	3	4	5			6			7			8		
Salisbury	Much Drying, 6.	240⅜	219	9	.....	.....	49	.....	.....	75	.....	.....	194	.....	.....
Ely		239	205½	14	.....	.....	47	.....	.....	56	.....	.....	22	.....	.....
Banbury		234	205	12½	.....	.....	41	.....	.....	48	.....	.....	42	.....	.....
Macclesfield		298	237	20	.....	.....	31	.....	.....	48	.....	.....	10	.....	.....
Croyden		533	190	18½	.....	.....	17	.....	.....	63	.....	.....	30	.....	.....
Cardiff		298	226	24	.....	.....	17	.....	.....	40	.....	.....	290	.....	.....
Liecester	Some Drying, 10.	264	252	.....	4½	.....	.....	32	.....	.....	48	.....	.....	11	.....
Rugby		191	186	.....	2½	.....	.....	42	.....	.....	10	.....	.....	.....	.....
Worthing		155	153	.....	.....	.....	.....	36	.....	.....	*23	.....	.....	.....	.....
Newport		280	216	.....	23	.....	.....	32	.....	.....	36	.....	.....	125	.....
Cheltenham		194	185	.....	4½	.....	.....	26	.....	.....	37	.....	.....	.....	.....
Bristol		245½	242	.....	1½	.....	.....	22	.....	.....	33	.....	.....	94	.....
Dover		222	209	.....	6	.....	.....	20	.....	.....	36	.....	.....	55	.....
Warwick		227	210	.....	7½	.....	.....	19	.....	.....	52	.....	.....	10	.....
Merthyr		301	262	.....	13	.....	.....	11	.....	.....	60	.....	.....	371	.....
Ashby		216	202½	.....	9	.....	.....	*19	.....	.....	56	.....	.....	.....	.....
Stratford		217	202	.....	.....	7	.....	.....	1	.....	.....	67	.....	.....	.....
Penzance	Little or no Drying, 8.	221	222	.....	.....	.....	.....	.....	5	.....	.....	*8	.....	.....	.....
Bryn Mawr		263	232	.....	.....	11	.....	.....	*6	.....	.....	56	.....	.....	.....
Morpeth		280	247	.....	.....	5	.....	.....	8	.....	.....	40	.....	.....	.....
Chelmsford		196	215	.....	.....	*	.....	.....	.....	.....	.....	*5	.....	.....	.....
Penrith		253½	250	.....	.....	.....	.....	.....	5	.....	.....	55	.....	.....	.....
Carlisle		280½	261	.....	.....	7	.....	.....	*10	.....	.....	.....	.....	.....	.....
Alverick		233	247	.....	.....	*6	.....	.....	*20	.....	.....	.....	.....	.....	.....
Totals	24	5,762	5,276	98	71½	24	392	222	17	239	245	240	888	96	276
Averages	.....	240	220	16½	7¼	3	28⅜	22¼	2	59	34½	30	111	12	34½
				8			17			38					

From the foregoing table it appears that the whole number of deaths from other causes than epidemic cholera, before the sanitary improvements, in the 24 towns averaged 240 per annum for every 10,000 inhabitants. The number of deaths from consumption averaged 33 per 10,000, and from typhoid fever 13. This leaves 194 deaths per annum per 10,000 from all other causes than cholera, consumption and typhoid fever. Or out of every 1,000 deaths from other causes than cholera, 137 were from consumption, 54 from typhoid fever, and 809 from other causes:

	Total.	Cons.	Typh.	Other.
Before improvements	1,000	137	54	809
Decrease when "much drying"	163	46	30	87
"some drying"	71	30	19	22
"little or no drying"	30	.....	16	14
Decrease per cent. when "much drying"	16.3	33⅓	55	10¾
"some drying"	7.1	22¼	34½	2⅝
"little or no drying"	3	.....	30½	1⅝
Decrease due to "much drying"	133	46	14	73
Decrease independent of drying	30	.....	16	14
Decrease per cent. due to "much drying"	13⅓	33⅓	24½	9
Decrease per cent. independent of drying	3	.....	30½	1¾

It would seem fair to infer that the decrease in the general death rate due to "much drying" where that took place, averaged 13⅓ per cent.; to "some drying," where only that took place, 4 per cent.. and to all other causes together, 3 per cent.; that the decrease of the consumption death rate due to "much drying" averaged 33⅓ per cent.; to "some drying" 22 per cent.; and to all other causes together nothing: that the decrease in the typhoid fever death rate, due to "much drying" averaged 24½ per cent.; to "some drying" 3½ per cent.; and to other causes 30½ per cent; and that the decrease in the death rate from all other causes than cholera, consumption and typhoid fever due to "much drying" averaged 9 per cent., to "some drying" 1 per cent. and to all other causes 1¾ per cent.

Without claiming for these inferred proportions, exact numerical accuracy, or putting them to any extreme, we are fairly entitled to conclude that drying the soil had more influence in decreasing the general death rate than all other causes together. Tabulating and classifying according to any other kind of improvement, we fail to find anything approaching to the same uniformity or magnitude of result.

The decrease in the death rate from typhoid fever, apparently

due to "much drying," was only 45 per cent. of the whole, that from diarrhœa still less; while the whole decrease of consumption was due to it.

The tables show, as they ought to, that the diseases known to arise from other and special causes, are not so much affected by wetness of soil, though aggravated by it; and that consumption is produced mainly by it, as was already known. That is, the inferences from the tables, are, on those points, corroborated by existing knowledge, and therefore likely to be correct in other respects.

The deaths from cholera, during three epidemics, all occurring before the improvements were made, averaged 50 per cent. more in those towns where there was afterwards "much drying" and which were therefore, probably, wettest, than in those where there was only "some drying"; and 100 per cent. more than in those where there was afterwards "little drying" and therefore, probably, in some cases certainly, dry already. Looking at individual cases, however, we do not find the connection between cholera and wetness of soil so uniform as between the majority of diseases, especially consumption, and wetness of soil.

With very few exceptions, the decrease in the death rate in the particular cases, as well as the general average, was greater where there was "much drying" than in those cases where there was only "some drying"; and in those where there was "some drying" greater than those in which there was little or none. This approach to uniformity among so many cases excludes all suspicion of accidental coincidence.

The good done by the sanitary operations in those four and twenty English towns was, therefore, mainly, the drying effected. It is very possible that the sewers as carriers of sewerage, in some cases did more harm than good, the excess of harm being more than compensated by the good they did as drains.

And yet, in most cases, this drying of the subsoil was not the thing particularly aimed at. The sewers were to carry off sewage and storm-water, and where there was any standing water, but the subsoil drainage was merely accidental or incidental. If the good effected so largely by accident has been so great, we may hope it will be much greater when the means are adapted to that special end.

We shall now consider those means.

Sewers and drains are built for three purposes: to carry off sewage; to carry off storm and hydrant water; and to drain the subsoil. We shall confine our remarks almost entirely to drains for the last of these purposes.

Sewerage, if water-borne at all, may be carried off by separate pipes, or by the storm-water sewers, according to the circumstances of the place. But we advocate a separate system of drainage, where the soil is wet, to carry off the subsoil water, for the following reasons.

In most soils, especially in wet and retentive soils, it is necessary, in order to get them well dried, to have the drains much nearer together than the sewers or the sewage pipes need to be, or can be.

Sewers need not, and should not, be many feet below the surface, except when they cut through a rising undulation of the ground. Drains, on the contrary, should be fifteen feet or more below the surface, so as to dry the soil to at least that depth, and to keep the deepest cellars dry. The deeper they are, the farther each way they will drain and therefore the farther apart they may be.

Drains can commonly run by the shortest and steepest lines to the nearest outlet. The almost constant flow being moderate in quantity is easily taken care of almost anywhere. On the contrary, sewers to carry storm-water must run on more regular grades, along lines of streets, and to some point, sometimes quite distant, whence a large quantity of water can run off without doing harm. If they carry sewage they should also reach a point perhaps still more distant, where it can do no harm.

A sewer, or pipe carrying sewage, must be tight, or else the deleterious matters or gases will escape into, and contaminate the soil, or the water in it. The soil, should not, therefore, be drained *into* them. It may be drained under, or alongside of such sewers or pipes; but it rarely happens that they are deep enough, or frequent enough, or run in the best direction. A sewer, even if it carried only clean rain-water, should not be used to drain the soil; for if it is not tight the water will run out of the sewer into the ground after a rain, by the same openings by which the subsoil water runs into the sewer at other times. This would keep the height of the subsoil water fluctuating, which is injurious to health. Drains unconnected with the

sewers keep the subsoil water at a uniform level. Water from cellars may be safely drained into subsoil drains, but not into sewers.

Before considering the position and construction of drains, let us first see where the water to be removed comes from, and how it comes. It may fall in rain or snow on the site; or it may be discharged there from water-works, sometimes to an amount that may equal, or exceed the rain-water. Or the water may come from somewhere else, by overland flow, or by percolation under ground. The mode and extent of drainage requirements are affected by the permeability of the soil, the position and inclination of the water, the slope of the surface, and the proximity and character of higher ground, and a proper place for discharge. One cardinal principle of drainage is to intercept the water as early, and as near its source as possible. As much as possible of the rain and waste hydrant water should be carried off at once over the surface or through sewers, and not allowed to sink into the ground, unless careful observation should show that an occasional rain-water subsoil washing does more good by carrying off impurities than harm, by varying the water-level, and in other ways. Overflow water from adjacent territory should be intercepted by channels, sewers or dykes, on the frontier of the site, so as not to come upon, and soak into the soil. Overflow of streams passing through the site may be guarded against by dykes, or what is better, enlarging their channel, or giving the channel a better section. A channel twenty-five feet wide and sixteen feet deep, will discharge one-third more than one of the sectional area of four times the width, and one-quarter of the depth. The width remaining constant, the capacity of the channel may be increased one hundred per cent. by adding to the depth only sixty per cent. In some cases, this deepening has not been done, from the erroneous supposition that it was of no use to make the bottom of a channel deeper than the basin into which it discharges.

The percolation of water underground from neighboring territory should be intercepted before reaching the site, if possible. That is commonly cheaper and more thorough. Often the water can be cut and carried off by a single drain, while if it is diffused over the site it would require many. Outside of the town the way is clear to drain to the best advantage; in the town

streets run wrong for draining, and foundations, houses, gas and water-pipes are in the way, and grades may not suit. The sooner the water is drained off the less it gets into the soil and the less harm is does.

Where such neighboring territory can be controlled, much may be gained by underdraining it all over. In most cases there should be a thorough and deep drain along the frontier of the town site to cut off the underground flow. A vertical stratum of open gravel should extend from the surface of the ground down to the drain, so that the water on reaching it shall immediately drop down through it to the drain. In some cases a course of sheet piling or thin cement wall may be necessary to prevent the water from crossing over the drain and going further laterally.

When the underground flow is too deep to be cut off, the drains should be as near as possible to the places where it rises, and as deep as possible so that it shall not spread, or rise high enough to do harm.

Drains should be fifteen feet below the surface if possible. They may be small round or rectangular unmortered culverts of stone or brick, pipes of terra-cotta or cement, tiles, &c. In any case they must be open at the joints or elsewhere to receive the water, be surrounded by open gravel or something equivalent, to exclude earth or silt, and a vertical stratum of gravel, even if only a few inches thick, should extend from the drain to the surface of the ground. Without this latter precaution drains may cease to take off the water at all from the soil some feet above them, after the filling over them becomes consolidated.

In many cases after sewering, the death rate has at first decreased, and then, after a while, increased nearly to what it was before. That is, the accidental effect of the sewer was to drain the soil so long as the filling around it remained open and porous, but when the filling settled and became nearly or quite water-tight, the drainage along the outside of the sewer ceased, the soil became wet again, and the death rate increased.

Cellars and foundations of dwellings should be kept dry, for if the cellar is damp the house will be damp. Some of the means besides the general drying of the locality, are cement or asphalum floor and cemented cellar walls, or, at least, external cement

or asphaltum plastering upon them. A cement or asphaltum layer upon or under the surface of the ground, all around the house, to prevent the surface-water from running down to the foundation; and subsoil drains all around the foundations, and when necessary under the floor. Where possible, water should not be drained out of the cellars but kept out, not dried but kept from getting wet.

There should be no communication between cellars and sewers or sewage pipes. The poison given from them contaminates even ice. Separate drains are sometimes made on or alongside of sewers or pipes. It would be better to make them several feet below, and fill with gravel between.

It is quite possible that the uses for which sewers were intended, may, in some cases, have been productive of more harm than good, while their accidental effects were so great as turn the scale the other way, in favor of good. Streams of filth running for miles and miles through the sewers all over a city, pouring their poisonous gases through the openings into the streets, through the "modern conveniences" into the bed rooms, and through the kitchen sinks into the larders, may be worse than the evils they are intended to remove; but the accidental good they have done in those cases by draining the subsoil, at least while the filling around them remained porous, seems to have more than compensated for the harm. Now if this has anywhere been the case, it would have been a great deal better, as well as cheaper, to put subsoil drains there instead of sewers for sewage. Probably the improvement in many a sewered town is not due to sewerage, but to drainage; however this may be, there is no doubt about the great benefit of subsoil drainage, unless the ground is dry already.

METEOROLOGICAL TABLES.

um, Maximum and Mean Temperature, at Newark, N. J.,

/ Wm. A. Whitehead, for Years 1844 *to* 1880, *inclusive.*

	MIN. TEMP.		MAX. TEMP.		MEAN TEMP. Each Five Years.
.....	January 12,	3¾ degrees.	July 14,	92½ degrees.	51.21 degrees.
.....	February 10,	3½ degrees.	July 14,	98¼ degrees.	51.37 degrees.
.....	February 27,	1½ degrees.	July 10,	94 degrees.	51.66 degrees.
.....	February 24,	0½ degrees.	July 19,	93½ degrees.	49.83 degrees.
.....	January 11,	.....	June 16,	94½ degrees.	51.25 degrees. —51.06 degrees.
.....	January 11,	2¼ degrees.	July 13,	99¾ degrees.	50.89 degrees.
.....	March 4,	9¾ degrees.	July 25,	93½ degrees.	52.86 degrees.
.....	December 27,	7½ degrees.	June 20,	93¾ degrees.	51.76 degrees.
.....	January 20,	2½ degrees.	June 16,	95¼ degrees.	50.57 degrees.
.....	January 28,	6¾ degrees.	June 21,	97 degrees.	52.75 degrees. —51.77 degrees.
.....	December 20,	2 degrees.	August 23,	99 degrees.	51.35 degrees.
.....	February 7,	8 degrees.	June 29,	96½ degrees.	50.68 degrees.
.....	January 9,	7¾ degrees.	July 27,	97 degrees.	48.95 degrees.
.....	January 24,	12 degrees.	August 14,	89 degrees.	49.95 degrees.
.....	February 24,	6¼ degrees.	July 11,	91½ degrees.	50.52 degrees. —50.29 degrees.
.....	January 11,	12¼ degrees.	July 13,	91½ degrees.	50.11 degrees.
.....	February 2,	4 degrees.	June 29,	90 degrees.	50.00 degrees.
.....	February 8,	7½ degrees.	July 9,	91½ degrees.	50.79 degrees.
.....	December 21,	5 degrees.	August 9,	90¾ degrees.	50.68 degrees.
.....	February 5,	3 degrees.	August 3,	90¾ degrees.	50.30 degrees. —50.37 degrees.
.....	February 18,	2 degrees.	June 26,	94½ degrees.	51.04 degrees.
.....	February 12,	1 degree.	July 7,	91½ degrees.	51.76 degrees.
.....	January 8,	12¾ degrees.	July 17,	98½ degrees.	50.65 degrees.
.....	January 20,	½ degree.	July 4,	88 degrees.	49.67 degrees.
.....	February 4th,	4½ degrees.	July 5,	92 degrees.	48.62 degrees. —50.35 degrees.
.....	March 1,	6 degrees.	July 16,	91¾ degrees.	50.40 degrees.
.....	December 30,	5¾ degrees.	June 28,	92½ degrees.	52.67 degrees.
.....	December 21,	1½ degrees.	May 30,	87¾ degrees.	50.46 degrees.
.....	December 25,	2 degrees.	July 2,	94 degrees.	50.44 degrees.
.....	January 12,	12 degrees.	July 3,	91½ degrees.	49.34 degrees. —50.66 degrees.
.....	February 2,	3½ degrees.	June 29,	91 degrees.	50.41 degrees.
.....	January 19,	3 degrees.	June 25,	92 degrees.	48.20 degrees.
.....	December 10,	4 degrees.	July 9,	96 degrees.	51.23 degrees.
.....	January 6,	7½ degrees.	July 26,	99 degrees.	53.21 degrees.
.....	February 4,	8 degrees.	July 3,	96½ degrees.	53.63 degrees. —51.34 degrees.
.....	January 3,	2 degrees.	July 16,	99¼ degrees.	51.75 degrees.
.....	December 30,	6½ degrees.	May 25,	96 degrees.	52.92 degrees.
ı of the 37 years.....					50.92 degrees.

n the foregoing table, the following facts a re ascertained:

That the lowest temperature has been experienced in ıry, thirteen times occurring, on nine of them between and 10th; in January, fourteen times, occurring on nine m between the 3d and 12th; in December, eight times, ing only once before the 20th, and in March twice, on ; and 4th.

That the warmest weather is most likely to occur in July, ; been experienced in that month twenty-one times, on

thirteen of them prior to the 15th; the next in number was June, ten times; then August, four times, and May twice, on 25th and 30th.

3d. That the extremes of temperature during the thirty-seven years was 112½ degrees; from 12¾ degrees below zero in January, 1866, and 99¾ degrees above in 1849.

4th. That the mean temperature of the years for the whole period was 50.92°; the coldest year being 1875, having a mean temperature of 48.20°, the warmest 1878, having a mean temperature of 53.63°.

5th. That such is the natural tendency to equalization in the course of years, that while the several years have differed nearly five and a half degrees (5.43°), yet between any series of five years, the greatest difference has been less than a degree and a half (1.42).

Highest and Lowest and Mean Temperature of the Several Months.

Months.	Highest Temp.	Lowest Temp.	Mean of All.
January	1876—65 degrees.	1866—12¾ degrees.	37 years, 29.11 degrees.
February	1874—68½ degrees.	1855—8 degrees.	37 years, 33.17 degrees.
March	1851—77¼ degrees.	1868—2 degrees.	37 years, 37.79 degrees.
April	1846—85½ degrees.	1857—17 degrees.	37 years, 48.71 degrees.
May	1880—96 degrees.	1861—31 degrees.	38 years, 59.19 degrees.
June	1853—97 degrees.	1843—38¾ degrees.	38 years, 68.50 degrees.
July	1849—99¾ degrees.	1845—46¼ degrees.	38 years, 73.61 degrees.
August	1854—99 degrees.	1854—46¾ degrees.	38 years, 71.55 degrees.
September	1854—93¾ degrees.	1843—34½ degrees.	38 years, 64.11 degrees.
October	1861—83 degrees.	1845—22¼ degrees.	38 years, 52.99 degrees.
November	1847—73¾ degrees.	1875—8 degrees.	38 years, 42.38 degrees.
December	1848—68½ degrees.	1852—7½ degrees.	38 years, 32.01 degrees.
Mean			51.11 degrees

Temperature of the Seasons.

SEASONS.	WARMEST.	COOLEST.	MEAN.
.....	1880——52.34 degrees.	1875——45.13 degrees.	37 years, 48.56 degrees.
.....	1877——75.34 degrees.	1859——68.12 degrees.	38 years, 71.40 degrees.
.....	1850——56.32 degrees.	1875——50.77 degrees.	38 years, 53.16 degrees.
.....	1879-80——35.91 degrees.	1867-8——24.89 degrees.	37 years, 30.59 degrees.
Mean			50.93 degrees.

he proportionate amount of fair weather during the several :s, and the number of days on which rain fell in mensurable ntities, and snow irrespective of quantity in each year:

YEARS.	FAIR. Equal to Days.	Mean of each 5 years.	RAIN. In Days.	Mean of each 5 years.	SNOW. In Days.	Mean of each 5 years.
.....	222		101		23	
.....	238		88		24	
.....	209		98		62	
.....	219		91		31	
.....	233	224	91	94	23	25
.....	214		95		22	
.....	224		97		28	
.....	232		91		18	
.....	233		90		28	
.....	236	227	96	94	21	23
.....	230		79		34	
.....	220		94		22	
.....	253		79		23	
.....	219		101		32	
.....	235	231	96	90	19	26
.....	220		90		28	
.....	227		79		28	
.....	226		86		34	
.....	216		99		29	
.....	213	223	113	93	27	29
.....	239		82		28	
.....	228		85		26	
.....	228		97		24	
.....	213		101		37	
.....	204	222	101	93	36	30
.....	228		112		38	
.....	220		88		27	
.....	227		98		27	
.....	243		86		31	
.....	232	232	97	96	35	32
.....	239		92		28	
.....	219		102		44	
.....	216		96		31	
.....	228		98		13	
.....	219	224	110	100	18	27
.....	204		112		44	
.....	218		116		28	
Means	226	.....	97	.....	29	.....

:om the foregoing table it is seen that the amount of fair ;her in any one year is, on an average, equal to 226 days. t the average number on which rain falls in quantities eptible of measurement is 97. That snow is observed on average 29 days in each year, and that on taking the age of each five years it will be found that the quantities nilate in a remarkable degree.

Table of Rain-fall at Newark for Thirty-eight Years.

YEAR.	January.	February	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Total.	Average of each 5 years.
1843					0.850	1.590	2.285	22.485*	3.610	5.905	3.920	4.145		
1844	4.985	1.640	4.785	0.390	3.550	2.560	5.820	2.080	2.970	5.515	2.040	3.875	40.210	
1845	3.370	4.210	3.765	1.275	2.155	3.400	2.175	4.800	2.455	2.255	2.875	3.735	36.470	
1846	5.125	4.160	3.415	3.265	8.745	2.175	4.730	4.105	0.550	2.815	8.745	3.745	51.575	
1847	4.655	6.075	4.145	0.859	3.155	6.250	3.305	2.890	11.300	3.460	2.840	5.910	54.835	
1848	1.825	1.815	2.395	1.335	5.985	6.005	2.065	0.955	2.195	4.965	2.720	4.520	36.780	43.974
1849	0.640	2.690	4.855	0.910	4.235	1.090	2.365	8.085	1.600	6.930	2.180	4.470	40.050	
1850	5.010	3.055	4.175	3.030	7.435	3.535	7.420	4.725	4.405	1.725	1.520	5.110	51.145	
1851	2.010	4.500	3.967	6.090	3.930	1.105	6.435	1.520	0.625	3.660	4.610	1.930	40.382	
1852	2.920	2.205	4.805	5.215	2.675	1.720	2.535	4.165	1.740	2.170	5.845	7.545	43.540	
1853	3.090	5.220	3.145	3.015	4.675	3.655	3.250	11.225	5.030	5.080	3.670	1.285	52.340	45.491
1854	1.790	5.020	0.980	11.365	4.170	2.100	3.580	1.125	3.960	2.440	4.310	2.635	43.475	
1855	4.030	3.466	1.875	2.470	2.365	4.525	4.470	4.160	2.250	5.260	2.890	6.500	44.261	
1856	3.370	1.250	2.000	2.570	4.315	3.120	1.410	5.700	2.665	1.400	2.790	3.483	34.075	
1857	3.830	1.500	1.990	7.155	6.030	5.345	5.080	4.015	3.810	3.955	0.870	5.785	49.365	
1858	3.405	2.495	1.010	3.852	4.995	4.650	2.995	4.210	1.410	3.010	4.785	4.260	41.077	42.451
1859	6.055	3.800	6.885	5.305	2.250	3.945	4.025	6.265	6.985	2.550	3.785	5.209	57.050	
1860	2.320	2.710	1.225	2.510	5.000	1.815	2.720	6.235	5.650	2.835	6.715	3.420	43.155	
1861	4.465	1.885	4.915	4.920	5.190	2.600	1.120	3.970	3.260	2.865	6.425	1.990	43.605	
1862	5.415	3.695	3.995	3.215	3.045	6.605	3.020	3.005	2.125	4.265	4.455	1.850	44.690	
1863	4.270	4.250	5.250	5.835	4.490	1.045	5.955	4.975	1.300	3.445	2.610	4.575	48.000	47.300
1864	1.730	0.825	3.145	3.670	5.280	1.855	2.675	3.210	4.680	2.675	3.950	4.760	38.455	
1865	4.090	4.570	4.890	3.340	5.730	3.485	6.735	3.935	3.210	4.685	3.300	4.385	52.255	
1866	1.740	5.070	1.820	2.820	4.400	2.505	1.840	5.345	5.470	3.970	2.090	2.910	39.980	
1867	1.610	5.640	4.395	2.575	6.550	9.745	3.755	10.615	1.235	4.620	1.945	2.045	54.730	
1868	3.275	1.620	2.170	5.255	6.925	5.895	8.535	4.755	8.955	1.250	4.375	3.845	56.856	48.475
1869	3.420	5.055	4.670	1.150	4.670	5.845	3.690	1.555	2.540	6.820	3.085	5.435	47.935	
1870	4.725	4.265	4.555	7.000	1.995	3.125	6.965	3.095	2.795	4.750	2.460	2.185	47.915	
1871	3.025	3.045	4.990	3.685	3.950	7.105	4.140	5.310	1.990	6.026	3.990	2.175	49.441	
1872	1.845	1.775	3.880	3.745	3.075	4.270	8.940	6.625	3.240	3.110	4.175	3.785	48.465	
1873	5.820	3.885	2.760	5.835	3.755	1.715	6.615	7.765	3.550	3.740	4.670	2.470	52.580	48.267
1874	5.670	3.168	2.135	8.715	2.755	3.580	4.230	2.785	9.050	2.435	2.860	2.810	50.193	
1875	3.310	2.400	3.820	3.135	1.595	2.335	5.985	10.215	1.930	2.870	4.360	2.610	44.565	
1876	1.200	5.355	10.000	3.305	3.045	1.585	3.060	2.450	7.505	1.260	4.040	2.515	45.320	
1877	3.060	1.650	6.075	3.125	1.010	4.170	5.980	7.730	1.470	7.735	6.915	0.920	49.840	
1878	6.525	4.960	3.635	1.730	4.205	2.445	4.330	8.060	2.535	2.830	4.570	7.469	53.294	48.642
1879	2.890	2.530	3.745	4.960	2.175	3.038	5.050	9.120	3.950	0.320	1.940	5.330	44.648	
1880	2.590	2.830	4.900	3.305	0.760	1.185	7.460	4.680	2.480	2.100	2.365	2.685	37.340	
Means	37 years 3.489	37 years 3.358	37 years 3.815	37 years 3.830	38 years 3.979	38 years 3.493	38 years 4.388	38 years 5.472	38 years 3.586	38 years 3.624	38 years 3.729	38 years 3.737	37 years 46.216	
Greatest	6.525	6.075	10.000	11.365	8.745	9.745	8.940	22.485	11.300	7.735	8.745	7.545	57.050	
Least	0.640	0.825	0.980	0.390	0.760	1.045	1.120	0.955	0.550	0.320	0.870	0.920	34.075	

*Very remarkable—perhaps unprecedented.

Seasons.

	Spring Months.	Summer Months.	Autumn Months.	Winter Months.
Greatest quantity in any one year	1854, 16.515	1843, 26.360	1847, 17.600	1852-3, 15.855
Least quantity in any one year	1855, 6.710	1854, 6.805	1879, 6.050	1871-2. 5.735
Mean quantity	37 yrs, 11.709	38 yrs, 13.353	38 yrs, 10.939	37 yrs, 10.676

From the foregoing table it will be seen that the yearly average of water deposited in rain and melted snow is 46.216 inches, the extremes being 57.050 inches as in 1859, and 34.075 inches as in 1856. It is also seen that while two years in conjunction may differ in quantity 18.055 inches, as in 1847 and

1848, yet the greatest difference in the average of any five years was only 4.849 inches as in 1854–58 and 1859–63. One practical result derived from this table is, that in every square foot of surface in Newark, there falls on an average twenty-eight and eight-tenths gallons of water in the course of a year.

Depth of Snow in each Winter.

	Feet.	Inches.		Feet.	Inches.		Feet.	Inches.
1843-4	2	7	1856-7	4	4	1869-70	1	6
1844-5	3	3	1857-8	2	4	1870-1	3	1
1845-6	4	4	1858-9	3	11	1871-2	1	4
1846-7	4	...	1859-60	4	3	1872-3	5	3
1847-8	1	10	1860-1	4	...	1873-4	3	...
1848-9	3	9	1861-2	4	4	1874-5	3	7
1849-50	2	7	1862-3	4	2	1875-6	1	...
1850-1	2	1	1863-4	1	10	1876-7	2	11
1851-2	5	3	1864-5	4	...	1877-8	1	2
1852-3	2	1	1865-6	2	11	1878-9	2	11
1853-4	5	11	1866-7	5	2	1879-80	7	...
1854-5	3	9	1867-8	6	3			
1855-6	5	5	1868-9	1	10			
Greatest Fall 1867-8							6 ft.	3 in.
Least Fall 1875-6							1 ft.	... in.
Mean							3 ft.	6 in

METEOROLOGICAL SUMMARY AT PATERSON FOR THE YEAR 1880,

BY J. S. HILTON, C. E., CITY SURVEYOR.

The total rain-fall for the year is largely in excess of the mean yearly fall recorded for a period covering nearly half a century. "Draper's" table of rain-falls, running back to 1834, gives 46.75 inches as the mean yearly fall for that series of years. Last year's fall amounts to 57.77 inches, an excess of 11.02 inches over the mean fall of 46 years. Of this total amount, 3.69 inches is due to melted snow, from an aggregate snow-fall of 44.75 inches in depth during the year.

Taking the amount of rain belonging to each season of the year, and comparing it with the mean fall for such seasons, we are enabled to compile the following table:

SEASONS.	Rain-fall for 1880.	Mean Fall.
Winter	13.79 inches.	10.47 inches.
Spring	8.06 "	12.44 "
Summer	22.34 "	12.45 "
Autumn	13.58 "	11.38 "

Here we find all the seasons in excess this year except spring, which fell short 4.38 inches, or about 33 per cent. of the mean. It is apparently rather an anomalous condition of things, to find a year with an aggregate rain-fall largely in excess of the mean fall of half a century, bringing with it a drought so widespread and severe as that of 1880. But in looking over the record an explanation is easily found. Taking the months of May and June, which show the heaviest mean rain-falls, with the exception of August, we find the year 1880 recording for them both but 3.75 inches against a mean fall of 8.60 inches, a deficiency of 4.78 inches, or nearly 60 per cent. This is the record for Paterson. At Newark and New York, the deficiency is still greater, the former place recording a falling off of 6.77 inches and the latter of 6.52 inches for the same months. We find further, that during May, 1880, there was but one day, and in June only three days, on which rain, otherwise than a mere sprinkling, fell.

This gives a period of 61 days, with only four days on which rain of any account fell. To this most unusual scarcity of rain, at the very period in which nature usually provides most bountifully for the saturation of the water-sheds and replenishing of the water-courses, was added a very high temperature for both months, and the prevalence of drying winds from the southwest, west and northwest. In these facts we can readily find sufficient causes for the severe drought, from which we are even yet not free, notwithstanding the large aggregate amount of rain for the year. During the year the greatest amount of snow fell in the months of March and December, it being 14 inches in each month. The least snow was in January, 3 inches. The heaviest monthly rain fell in July, amounting to 12.06; the least in May, 0.85 inches. The longest period without rain was 22 days, from the 31st of April to 21st of May (inclusive.) During the year rain fell in measurable quantities on 115 days. During 1879

in fell on 114 days. The mean temperature for the year was °, 5° above the average. The temperature of the winter onths was 37°, nearly 7° above the average. The spring onths were 6° above the average, and the summer and autumn onths, 6° and 1° respectively above the average. This record ows an unusually high temperature for the past year. The ver was unusually low during the whole year. The highest ater recorded for the year was on the 14th of February, it ing then 3 feet 10 inches above extreme low water. On the th of March it was only 1½ feet above extreme low water level, d on April 28th it was barely 10 inches above extreme low ater at the Arch street bridge. In April, 1879, it was 5 feet 10 ches above low water at the same point. From May to the d of the year the highest level reached was only 1 foot 8 ches above extreme low water,—and the rise was only tem- rary, the water rapidly falling after each rise, and from May the end of the year it approximated but a few inches above treme low water, the rains having little effect on it. The markably heavy rain of July, amounting to 12.06 inches, ised it but one foot above extreme low water. There is no cord to show that the Passaic river has ever been at so low a age of water continuously as during the year 1880. Since ay there has been no time during any month when the aver- e level has been more than one foot above extreme low water, low the Falls, and that only for a few days.

In fact, the drought, in duration, may be stated as one lasting ght months, and a drought of that extent may be safely corded as having never been equalled, at least within the emory of the "oldest inhabitant." During 1878 and 1879, e low water in the river lasted only twenty-five days in the mer, and forty-four days in the latter year. Against these riods, a drought of two hundred and forty days for 1880 is markable, and the drought of 1880 bids fairly now to extend to 1881. The rain fall of December, 1880, is far below the cord for the last two years, and is 1.50 inches below the mean l for the month. The stage of the river at present is but a w inches above extreme low water.

In 1878, the river in December was ten feet above low water, d in 1879 it was nearly three feet above. Never since the corporation of the Passaic Water Company has its capacity

been so tried as during this year. Since May, their turbine has been used only a few days, and the steam pumps have been working continually night and day. During October, the water in the river and reservoirs was so low that, by agreement, the manufacturing establishments along the race-ways stopped work for one day (the 12th) to allow the river to fill up, and give the Passaic Water Company a chance to fill up their reservoirs. Thousands of dollars have been lost to these establishments during the year, in the enforced short time and stoppages, caused by the scarcity of water.

City Surveyor's Office, City Hall, January 5, 1881.

Table of Temperature and Rainfall at Freehold, N. J., from July 1st, 1879 to July 1st, 1880.

MONTHS.	Minimum Temperature.		Maximum Temperature.		Monthly Mean Temperature.	Rain or snow fell on days.	Total Rain-fall or melted snow.	Mean do. of five years.	Mean relative humidity.	Prevailing winds.	Thunder and lightning on days.
	Date.	Degree.	Date.	Degree.			Inches.	Inches.	Per c't.		
July	1 and 6	56.	16	97.	73.76	10	5.45	4.91	78.3	W.	10
August	10	51.	3	92.5	70.853	10	9.58	6.59	83.4	W.	5
September	26	37.	1	85.	61.44	8	1.86	2.92	80.2	W.	6
October	26	24.5	3	83.	58.49	9	0.68	2.85	79.6	W.	2
November	21	15.5	12	72.	41.498	7	1.71	4.40	74.2	W.	1
December	27	8.	4	60.	36.71	12	6.77	3.82	80.3	N.W.	—
1880. January	14	11.	28	58.5	38.183	11	2.06	3.03	81.4	W.	1
February	2	9.	27	67.	34.757	11	2.69	2.67	76.1	W.	—
March	25	16.	5	69.	36.863	16	5.71	5.95	74.2	N.W.	—
April	12	23.	15	82.	49.707	12	2.91	2.90	67.5	N.W.	7
May	1	32.	27	94.5	67.15	6	0.82	2.32	69.2	W.	5
June	3	49.	24	94.2	71.966	7	1.58	2.99	71.6	W.	3
Totals		332.0		954.7	641.377	119	41.82		916.0	W.	49
Means		29.3		79.5	53.448	9.9	3.48		78.3	W.	4.7

tions taken by Frank Osborn, Middletown, N. J., from July 1st, 1879 to July 1st, 1880, inclusive—Maximum and Minimum Temperature.

1879.

OF MONTH.	July.		August.		September.		October.		November.		December.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
....	86	61	85	68	87	62	79	56	54	27	42	18
.....	85	59	89	69	88	63	92	61	50	27	45	21
.....	87	57	92	71	85	65	81	60	54	32	60	32
.....	92	69	92	72	72	67	90	54	41	22	62	38
.....	93	62	84	66	84	62	81	52	47	19	73	32
.....	69	56	87	68	81	59	81	55	50	18	45	36
.....	73	55	88	71	78	60	71	56	55	31	58	45
.....	77	56	74	69	83	65	75	57	58	32	60	40
.....	82	66	81	61	79	54	76	57	59	38	62	36
.....	86	66	68	53	75	51	87	63	74	58	47	36
.....	89	67	77	53	75	51	75	62	76	43	60	45
.....	88	67	80	60	73	55	66	59	53	43	63	36
.....	77	62	84	60	75	53	75	60	78	51	50	22
.....	81	61	84	61	73	51	79	49	72	49	40	24
.....	87	68	85	64	72	52	78	49	65	50	46	35
.....	96	69	72	64	74	49	83	58	75	50	52	25
.....	96	69	74	64	73	49	89	62	66	38	38	25
.....	84	59	78	66	78	50	82	61	68	38	52	18
.....	78	58	69	63	76	54	81	55	48	30	44	18
.....	77	58	81	62	71	52	71	39	48	32	35	28
.....	76	57	81	60	72	54	67	39	36	13	36	22
.....	79	60	82	60	62	56	66	45	32	13	38	15
.....	91	65	89	66	59	50	67	56	39	14	40	30
.....	87	67	80	62	73	49	75	40	54	24	42	30
.....	78	66	75	61	75	45	53	27	52	24	45	61
.....	73	65	68	60	65	42	48	27	53	28	37	8
.....	73	65	66	57	68	42	59	36	56	31	33	6
.....	86	70	71	55	68	48	55	37	52	32	30	9
.....	83	69	78	57	72	50	69	42	61	49	45	29
.....	84	69	84	59	69	54	64	45	55	23	48	35
.....	79	69	85	59	.....	.....	54	27	.....	.....	57	19

1880.

OF MONTH.	January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
.....	33	19	50	24	70	36	62	29	63	31	78	60
.....	35	28	40	7	54	25	69	38	66	33	90	49
.....	49	26	32	31	52	25	60	39	72	52	60	48
.....	48	30	37	22	54	35	70	51	82	54	71	52
.....	56	32	38	10	71	48	66	50	85	52	78	56
.....	58	36	32	12	70	39	70	41	75	52	77	58
.....	51	38	46	24	58	34	59	32	85	51	83	64
.....	50	31	44	12	42	33	48	23	65	47	88	63
.....	50	31	41	15	53	24	49	27	72	51	68	55
.....	51	32	40	8	32	24	56	31	93	53	76	53
.....	62	31	34	12	47	22	69	35	92	62	77	58
.....	55	38	42	35	27	20	49	22	86	56	81	61
.....	55	22	50	41	36	24	47	22	79	49	94	69
.....	35	12	68	49	35	27	62	36	65	46	88	66
.....	49	12	56	31	*	*	83	52	59	39	78	62
.....	50	28	35	27	40	30	86	53	70	45	67	57
.....	55	25	40	27	37	30	60	44	80	62	73	56
.....	46	26	58	27	47	20	60	36	88	60	79	59
.....	50	33	62	31	46	26	71	38	70	52	82	60
.....	55	34	45	16	41	30	60	45	60	56	89	65
.....	56	30	45	16	51	27	65	40	85	55	88	65
.....	52	30	*	*	50	27	71	40	87	60	89	65
.....	54	32	*	*	51	27	74	32	80	62	85	61
.....	50	28	51	20	60	32	57	39	80	64	87	65
.....	50	27	48	21	41	13	45	38	89	65	97	73
.....	42	30	49	31	44	18	50	42	99	68	94	71
.....	55	30	59	42	52	24	65	49	97	71	93	70
.....	57	40	*	*	48	35	65	40	98	67	90	71
.....	69	30	75	42	38	28	69	42	92	58	93	70
.....	50	22	.....	.....	41	28	62	44	75	58	93	72
.....	52	41	.....	.....	*	*	.....	.....	76	62	.....	.....

*No observations taken.

Maximum, Minimum and Mean Temperatures. Station, Barnegat, New Jersey.

1878.

DAY OF MONTH.	July.		August.		September.		October.		November.		December.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	82	61	74	64	82	73	69	56	47	37	48	38
2	82	66	85	65	84	72	75	59	56	35	57	46
3	83	67	84	67	78	70	70	59	49	38	49	37
4	88	67	82	67	74	70	71	57	50	31	53	40
5	82	66	82	69	76	66	64	53	42	28	41	29
6	77	64	79	65	73	66	64	51	56	31	43	30
7	80	66	82	65	73	66	63	46	40	34	41	27
8	81	69	86	67	68	64	66	52	43	31	38	25
9	75	64	80	68	71	66	73	59	42	29	51	37
10	73	62	81	67	73	68	67	55	53	35	55	41
11	74	64	78	68	74	68	60	55	57	35	45	33
12	70	64	77	67	76	68	58	51	62	43	40	30
13	71	64	78	65	77	67	67	47	58	37	39	27
14	75	62	76	68	73	58	68	46	46	33	42	29
15	84	63	76	70	72	66	70	57	45	30	45	33
16	72	66	80	69	69	60	72	58	53	44	34	26
17	79	65	77	70	71	55	70	62	54	50	33	28
18	94	68	83	71	80	59	70	46	54	43	37	26
19	89	68	78	69	75	63	56	44	52	43	31	21
20	79	72	79	66	82	67	62	39	49	41	32	23
21	84	72	77	65	83	69	67	43	55	40	49	33
22	79	66	72	65	70	56	64	45	54	46	47	30
23	82	63	70	65	65	56	66	56	47	38	31	19
24	78	64	73	60	74	63	61	47	56	35	29	15
25	88	66	78	65	72	63	57	43	57	43	22	13
26	78	65	72	60	77	60	61	44	54	37	21	12
27	84	65	77	59	61	49	63	54	57	37	28	20
28	77	65	75	63	60	54	58	41	57	38	31	18
29	80	63	74	63	67	54	52	38	48	35	30	19
30	72	62	78	64	68	62	63	45	48	30	35	21
31	67	62	77	64	.....	.....	52	40	.....	.....	34	19
Range	33°		27°		35°		37°		34°		45°	
Monthly Mean	71°.2		71°.1		67°.6		57°.2		43°.8		32°.9	

1879.

DAY OF MONTH.	January.		February.		March.		April.		May.		June.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1	36	23	33	20	34	24	55	33	61	43	75	57
2	37	8	26	16	36	26	49	34	59	39	73	55
3	13	1	36	25	36	28	50	28	62	39	66	57
4	21	6	38	23	41	32	39	24	54	46	72	56
5	21	11	37	21	50	36	38	25	61	48	76	58
6	28	11	35	28	41	32	47	23	67	49	78	58
7	31	14	37	27	43	30	53	37	57	45	65	48
8	41	22	32	23	33	26	44	32	57	45	74	52
9	41	27	42	18	42	31	60	32	56	46	74	51
10	28	19	33	19	51	36	49	42	57	48	73	60
11	33	17	43	32	65	39	43	37	56	47	79	57
12	35	26	47	34	48	32	49	31	59	48	70	57
13	37	27	35	25	47	31	57	32	66	52	72	59
14	38	28	26	16	51	39	49	41	68	54	71	56
15	29	22	22	8	47	31	48	40	68	53	74	55
16	35	20	33	10	42	30	51	42	68	54	84	56
17	33	18	33	29	54	32	43	39	67	56	73	56
18	38	27	34	26	33	26	42	38	72	56	66	52
19	30	22	29	24	38	23	41	36	65	56	67	55
20	22	12	32	25	51	21	59	34	70	57	67	57
21	35	9	25	16	57	38	56	33	67	57	76	55
22	42	20	32	10	44	34	59	43	63	53	70	58
23	44	28	37	25	44	33	69	45	59	50	75	58
24	38	22	34	23	41	28	55	42	67	41	75	60
25	52	32	36	26	48	33	53	45	71	53	68	59
26	34	17	46	32	38	26	64	43	65	54	74	61
27	37	18	38	20	45	36	48	41	63	48	84	59
28	61	25	26	14	49	38	57	43	66	58	78	56
29	42	29	.....	.....	42	36	54	49	72	55	74	53
30	36	21	.....	.....	55	38	65	47	72	58	72	60
31	41	24	.....	.....	41	33	.....	.....	70	58	.....	.....
Range	62°		39°		44°		46°		33°		36°	
Monthly Mean	28°.2		29°.1		38°.7		44°.3		57°.6		64°.9	

METEOROLOGICAL SUMMARY FOR 1880.

tation, Bayard Avenue, Princeton, N. J. Latitude 40° 21′ N.; Longitude, 2° 20′ E. Height of Barometer Cistern above Sea Level, 225 Feet.

OBSERVER, PROF. C. G. ROCKWOOD, JR.

	Barometer. (Reduced to 32 degrees.)			Thermometer.			Mean Humidity.	Prevailing Wind.	Rain, (inches)*	Snow.	Days when precipitation equalled 0.01.	Cloudy days.
	Max.	Min.	Mean.	Max.	Min.	Mean.						
y.....	30.424	29.307	29.940	60.5	2.5	37.71	‡	N. E.	2.82	4.0	8	9
ıry.....	30.359	28.848	29.856	67.5	8.3	35.40	69.0	N. W.	2.43	6.5	10	7
.....	30.225	29.146	29.813	71.5	16.4	36.73	68.9	N. W.	5.20	9.5	16	13
.....	30.104	29.319	29.767	79.5	24.7	49.97	62.6	N. W.	4.12	.....	11	7
.....	30.052	29.499	29.812	97.3	32.7	66.96	62.3	S. W.	0.62	.....	4	6
.....	30.032	29.358	29.746	97.3	48.2	71.82	63.3	S. W.	1.41	.....	8	3
.....	29.923	29.431	29.739	93.0	55.0	72.81	72.4	W.	11.13	.....	12	7
.....	30.183	29.467	29.814	89.3	50.9	70.74	77.5	S. E.	3.21	.....	7	10
ıber.....	30.116	29.436	29.802	91.0	43.9	65.27	71.6	S. W.	2.25	.....	8	7
r.....	30.171	29.232	29.865	80.0	29.3	52.22	71.0	N.W.&S.W.	2.56	trace	10	7
ıber.....	30.489	29.301	29.996	68.3	11.3	37.87	73.24	N. W.	2.66	3.0	8	11
ber.....	30.224	29.342	29.782	46.7	11.0	26.09	74.5	W.	3.57	17.75	10	11
he Year.....	30.489	28.848	29.829	97.3	11.0	51.97	.....	.....	41.96	40.7	112	96

*Including melted snow. ‡Hygrometer not mounted.

Summary of Weather Observations at Vineland, N. J., for 1880.

MONTHS.	TEMPERATURE.			MOISTURE.			BAROMETER.				FROST.			WINDS.							
	Max.	Min.	Mean.	Hygrom.	Rainy days.	Rain in inches.	Max.	Min.	Mean.	Range.	Any frost.	All frost.	Thunder days.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
January	61	10	41.28	71	12	2.820	30.450	29.525	30.041	.925	12	.....	.....	10	8	2	15	1	26	2	29
February	69	12	39.68	60	7	2.260	30.392	29.014	29.923	1.378	17	3	.....	.....	3	.....	14	7	29	9	25
March	74	20	40.91	69	13	6.350	30.306	29.144	29.864	1.162	12	.....	1	7	17	2	5	4	16	8	34
April	82	22	53.06	65	10	2.610	30.164	29.414	29.808	.750	5	.....	2	1	5	1	13	9	24	2	35
May	96	34	69.20	63	5	.200	30.068	29.606	29.871	.480	.....	.....	1	5	3	1	20	12	22	6	24
June	97	52	74.77	69	5	3.050	30.112	29.527	29.842	.585	.....	.....	7	12	12	.....	10	7	27	13	14
July	98	56	76.45	73½	8	8.636	30.024	29.560	29.838	.464	.....	.....	7	9	6	.....	12	3	37	1	25
August	90	50	73.03	77	8	6.635	30.230	29.592	29.909	.638	.....	.....	7	4	20	1	12	5	41	1	9
September	92	44	66.83	80	5	2.941	30.160	29.590	29.899	.570	.....	.....	.....	4	11	2	12	5	29	8	19
October	92	28	63.84	74	7	1.140	30.589	29.384	29.996	1.205	6	.....	.....	9	16	4	5	10	24	7	18
November	67	9	38.22	63	9	4.440	30.594	29.500	30.076	1.094	21	7	.....	6	10	.....	13	4	22	16	19
December	50	10	28.23	56	10	7.525	30.330	29.534	29.910	.796	27	16	1	8	10	1	3	3	18	13	37
Means	.....	.....	55.23	.....	99	50.397	.....	.....	29.915	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Yearly range of barometer	.....	.....	.....	.....	.....	.....	.....	.....	.....	1.580	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Yearly range of temperature	.....	.....	.....	.....	.....	.....	108°	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	100	26	28	75	121	14	134	70	315	83	288

GENERAL FACTS.

Under the caption "Frost," where it says "any frost," i. e. frost any part of the day, this foots up 100 frosty days for the year; while under "all frost," it means the frost was continuous through the day, and under this there were 26 days in the year.

The average number of "any frost," for 15 years, is 92 days in a year, and of "all frost," for same time, is 27 days; highest number "any frost" is 113, lowest 75, in 1878; highest "all frost," 45, in 1868; lowest "all frost," 16, in 1869 and 1870.

SNOW IN GENERAL HERE.		Any frost.	All frost.	WINDS FOR FIFTEEN YEARS. N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Number of observations.
1866	23½ inches	92	22	26	81	10	106	4	546	33	289	1,095
1867	49¾ "	91	38	25	174	31	170	15	370	36	274	1,095
1868	40 "	113	45	20	191	28	152	9	381	24	293	1,098
1869	13¾ "	101	16	3	129	23	87	10	493	28	322	1,095
1870	15 "	76	16	24	158	23	158	19	378	67	278	1,095
1871	36¾ "	78	30	14	157	14	160	22	347	85	296	1,095
1872	49½ "	113	35	21	116	16	145	22	416	125	237	1,098
1873	15½ "	92	19	16	182	39	155	26	329	120	238	1,095
1874	17 "	92	19	28	184	21	115	38	378	96	235	1,095
1875	50½ "	101	39	29	186	19	109	27	401	76	248	1,095
1876	25¾ "	91	30	45	136	19	106	53	413	77	249	1,098
1877	36¾ "	79	18	57	178	20	86	77	343	59	275	1,095
1878	7¾ "	75	24	63	152	25	140	59	310	53	293	1,095
1879	11 "	92	21	78	101	23	93	80	369	75	276	1,095
1880	54⅛ "	100	26	75	121	14	134	65	315	83	288	1,098
Total	444 9-20 "			524	2,346	325	1,916	526	5,789	1,037	4,081	16,444
Average (nearly)	30 "	92 2-5	26 8-15	35	150	22	128	35	386	69	272	

Wind Before, During and After Rain in 1880.

Wind.	Before.	During.	After.
N.	5	0	5
N. E.	7	25	6
E.	1	6	0
S. E.	10	23	4
S.	9	15	6
S. W.	28	26	16
W.	0	2	8
N. W.	7	13	20

OUR MILK SUPPLY.

WILLIAM K. NEWTON, M. D., STATE MILK INSPECTOR.

Milk is the type of food; it is the model alimentary substance. Containing, as it does, the essential varieties of nourishment, it is sufficient for the maintenance of life, and, unaided by other foods, is able to keep the system in a healthful state. It constitutes, almost exclusively, the diet of children at that time of life, when they are the least able to withstand any interference with the purity of their food. In short, it is one of the most important articles of food that enter into daily use. It is absolutely necessary, then, that an article so universally used, and one playing so important a role in every-day life, should be easily obtained in a pure state, unadulterated, and free from the germs of disease. There is, however, no one article of food that is so frequently adulterated or sold in an impure state, as the one now under consideration.

What is to be done, then, to check this trade in impure and diseased milk? The people look to the State for stringent laws against adulteration, and to our health officers for the rigid and impartial enforcement of such laws. Our citizens are deeply interested in the subject; aside from the great loss of money entailed by the sale of watered milk, the health and lives of their children are at stake.

If we look at our vital statistics, it will be noticed that the death-rate during the first five years of life is enormous; the chances of surviving beyond the fifth year are small indeed. In infancy, when the tenure of life is the slightest, when the death-rate is the highest, and the amount of sickness the greatest, then will we find the disastrous results that follow the use of skimmed and watered milk. It is our duty to remove in every way, even

the slightest cause of ill-health or death. The lives of these children are of value to the nation.

It is estimated that a life is worth one thousand dollars to the State and every death, consequently, is so much loss; if we look at the subject in this light, leaving out of consideration the wreck and sorrow in the household, the subject is of vast importance and one demanding the most careful thought. "The child is the promise of all the hereafter. The whole future of the world is wrapped in him. Unless he fulfill this promise and grow to manhood, the family ceases, the State perishes, the human race comes to an end. The family has the intensest interest of affection in his preservation, and all the pride and power of the nation rests on his life." (*Jarvis.*)

The increase in infant mortality is largely caused by artificial feeding and the use of milk devoid of nourishment. The danger is a real one; sickness and death are caused by feeding the children on skimmed and adulterated milk. The sooner the subject is grappled with and the remedy applied the better will it be for our infant population.

Let stringent laws be passed prohibiting the sale of adulterated and impure food and let these laws be enforced. Let our health authorities be impressed with the great responsibility resting on them. Good work will be done when this nefarious traffic in impure milk is broken up and when the dealers in it—who are not inaptly called our modern Herods, the slayers of infants—are brought to justice. This branch of preventive medicine is a vital one, and demands our serious attention.

We may state, in the beginning, that this article is not an exhaustive one. It is written in the interest of public health and aims to teach the people a little about our milk supply, the adulterations used and the dangers that may arise from the use of impure or diseased milk. As far as possible technicality has been avoided, as we do not seek to teach experts; chemical processes have been omitted, as all attempts at entering into competition with special treatises on the subject would do little good. We have refrained, when we could, from burdening the text with foot-notes and references, but have added a somewhat exhaustive bibliography at the end of the paper, which may be consulted by any one wishing further information on the subject.

For convenience, we have divided the subject with various sec-

tions, and will consider it under the following headings: A, the source of our milk supply; B, adulteration; C, detection of adulteration; D, effects of impure milk on the health; E, diseased milk may cause disease in man; F, feeding influences the healthfulness of milk; G, milk as an article of contagion; H, laws bearing on our subject; I, the inspection of milk; J, bibliography.

A.—THE SOURCE OF OUR MILK SUPPLY.

One who has not investigated the subject will be astonished at the immense amount of capital invested in the dairy interest in our State. There are in New Jersey about one hundred and sixty thousand milch cows, representing, in value, five million six hundred and eighty thousand dollars; if to this is added the capital invested in the milk business in its various branches, not far from seven million dollars will be found to be locked up in the different branches of the trade. The daily production of milk is about two hundred and forty thousand gallons; a large quantity of this is shipped to New York City; the Midland Railroad carries, on the average, four hundred and twenty cans a day to New York; the Central Railroad, three hundred and twenty-five cans; the Delaware, Lackawanna and Western Railroad, three hundred and eighty cans. By far the largest amount produced is used in our own State, in the butter and cheese factories and as food.

New Jersey contains but few large cities; there are but seven cities with a population greater than twenty-five thousand. Small towns preponderate. Hence the greater quantity of milk used as food is obtained in the towns in which it is used, very little being transported from the source to the place where it is consumed. Newark, Jersey City and Hoboken are the only large towns that receive much milk by the railroads. Inspection, then, is not easy, and the supply being in the hands of many small dealers is not well under control. The greatest source of impure milk is that produced by cows shut up in the stables in the cities; these animals are poorly housed and fed, and milk thus made cannot be of good quality; this last remark is peculiarly applicable to the cities of Newark, Jersey City, Hoboken and Paterson. Our farmers are, as a rule, honest, and endeavor to supply a pure article; the greatest trouble is with the dealers

in the towns and cities, who are not themselves dairymen, but who buy from producers, and who adulterate to a greater or less degree. Only local inspection can reach them. Many of the cheese factories send skimmed milk to our towns and cities, and the use of this article cannot but be followed by a long train of disease among the children.

B.—ADULTERATION.

The list of substances said to be used for the purpose of adulterating milk, is a long one. Every authority writing on the subject of milk adulteration has, in preparing the work, copied from various books the names of materials at any time used, hence they make now a formidable catalogue. Practically speaking, adulteration, in this country, is limited to the use of water, sodium carbonate or bicarbonate, potassium nitrate, turmeric, annatto, caramel, salt, borax, and possibly magnesium carbonate and glycerine. Fortunately, the adulteration practiced is limited and the substances used are easy of detection.

The substance must needs be such that its introduction into the milk will not be detected by the naked eye, and must neither be precipitate nor float on the surface. At the same time the material added must not coagulate on boiling, nor give taste, odor or color to the milk by which its presence may be easily discerned.

We have, notwithstanding the fact that many of these materials are never or but seldom used in this country, thought it best to mention the substances said to be used, in order to make the subject more complete. The substances thus said to be used in the adulteration of milk are:

Water,
Sodium carbonate and
Bicarbonate,
Borax,
Magnesium carbonate,
Potassium carbonate,
Sugar,
Caramel,
Potassium nitrate,
Turmeric,
Annatto,
Flour,
Starch,
Arrowroot,
Gum Arabic,
Dextrine,
Gum Tragacanth,
Chalk,
Gelatin,
Glycerine,
Emulsion of almonds and
Hempseed,
Brains,
Hempseed.

We will now take each in turn, and state for what purpose it is added.

Water is by far the most common adulterant. It was estimated by Professor C. F. Chandler, that "the average milk sold in New York City, consisted of three-fourths milk, and one-fourth added water. The 120,000,000 quarts of milk sent annually to New York receive an addition of 40,000,000 quarts of water, which sold at ten cents per quart, brings four million dollars per annum, or twelve thousand dollars per day. This fraud, besides being expensive, exerts a most unfavorable influence on the health of young children especially." It is difficult to trace the adulteration with water to its source; milk passes through so many hands before reaching the consumer, that it may have received two or three dilutions before being served on his table. In our tours of inspection in various parts of the State, we found that the farmers, as a rule, were honest in their endeavors to send pure milk to market, but there are many dishonest men among that class. A farmer, for instance, may have a contract to supply a dealer with five cans of milk daily; from some cause the supply falls short ten quarts, and if the producer be dishonest, the deficiency is made up with water. Now the ten quarts in five cans may appear to be a small quantity, and will be difficult of detection; but when this milk reaches the middle-man, and his supply is not sufficient to meet the demand, he dilutes it to bring it up to his quantity, and by the time the consumer gets it, three or four dilutions may have been practiced. The most adulterating is not done by the farmer; the exaggerated examples are to be found in our cities, among the smaller dealers. It is to be hoped that if adulteration is done with water, that it is free from the germs of disease.

Sodium, carbonate and bicarbonate. These substances are added to disguise an excess of acidity, and in some cases, to increase the specific gravity.

Borax is added for the same purpose, and also to retard the separation of cream, and to preserve the milk.

Magnesium and potassium carbonates are added to correct acidity and to cover a blue tinge.

Sugar and caramel are used to give color and to develope the flavor of impoverished milk.

Salt is used as a flavoring agent and to increase the specific gravity of skimmed and watered milk.

Potassium nitrate has been discovered in milk from Orange County, N. Y. It is added to increase the specific gravity and to act as a preservative.

Turmeric and annatto are used to cover a blue color.

Flour, starch, arrowroot, gum-arabic, gum-tragacanth, dextrine, emulsion of almonds and hempseed are said to be added to increase the consistency of milk, but the fraud is so transparent that it is hardly probable that any of these substances can be added successfully.

Chalk. This substance is popularly supposed to be a favorite adulterant. It is hardly probable that it is used; the certainty of its detection is against its use. It is asserted that chalk is used to make milk that has been watered white and to correct acidity.

Gelatine has been added to give consistency.

Glycerine is used to increase specific gravity, to give consistency and taste.

Brains. Every book on food-adulteration mentions the fact that calf-brains have been used to thicken milk. This may have been done at some time, but it is difficult to trace this statement to the originator, and it is hardly probable that any person, however depraved, would use this substance as an adulterant.

C.—DETECTION OF ADULTERATION.

Having mentioned the various adulterants and the purposes for which they are used, we will now consider the methods employed for their detection.

Water. There are three methods for determining the amount of water added to milk: 1, by determining the specific gravity, 2, by chemical analysis, 3, by estimating the percentage of cream. Unless a standard of purity is fixed on beforehand it will be impossible to estimate the quantity of added water. Whether a chemical analysis is made or a hydrometer used it does not alter the case; a standard must be agreed on.

In New York City, the hydrometer is used as an instrument for determining the amount of dilution with water. In Massachusetts, Rhode Island and Maine a chemical examination is required by law when suit is brought against an offender.

1. SPECIFIC GRAVITY METHOD.—For determining the specific gravity, a hydrometer is ordinarily used, but in cases requiring great accuracy the gravity is arrived at by weighing a known quantity of the milk. The latter plan being employed by chemists. The hydrometer used in testing milk, is called, in this country, a *lactometer*. All tests are made at 60° Fahrenheit.

Much has been written, within the past few years, for and against this instrument; but had the instrument and its use been clearly and honestly defined, there had been no necessity for any discussion. The lactometer is nothing but a hydrometer, and it can do no more than register the specific gravity of milk. It can, within certain bounds, tell the amount of water added, and can, with a certain degree of accuracy, detect skimmed milk.

If we take pure milk, and allow the lactometer to float in it, the instrument will sink to a certain mark in the stem. If we now add water to the milk, the specific gravity is lowered, and consequently, the lactometer will sink lower in the fluid. If we skim the milk, the instrument will float higher in consequence of the increased specific gravity. The lactometer favors the milkman rather than the consumer; the only error it can make would be in a case where the milk had been *adulterated* with cream; then the specific gravity would be lowered and the instrument would register a point equal to watered milk. It is well to bear in mind that the lactometer, to be of any service, must be used by a person who is a competent judge of milk and is thoroughly acquainted with the pure article; such a person would easily distinguish between watered milk and milk rich in cream. A person conversant with milk can tell, with any instrument, whether a milk is rich or poor, and a man is not competent to act as inspector who cannot make these distinctions.

Now, if we use the lactometer as the instrument for the detection of added water, what specific gravity shall be taken as that of pure milk? The New York Board of Health has taken the lowest average for pure milk, and fixed the standard at the specific gravity of 1.029 at 60° F. We do not propose to lengthen this article unnecessarily by quoting authorities to prove the accuracy of this standard. Suffice it to say, that hundreds of samples of milk, known to be pure, have been examined by the New York authorities, and in no case, where the milk

was from a healthy cow, did the specific gravity fall below that figure. And, in this State, in our capacity of State Milk Inspector, we have inspected hundreds of samples of milk, known to be absolutely pure, and in no instance did we find a single sample to have a specific gravity as low as 1.029. We can state, then, that the New York standard is many degrees too low, and admits of watering from five to ten per cent. If any one wishes to consult authorities, the list of authors appended to this article may be used.

In lawsuits, in New York City, the lactometer has many times been criticised, but as a rule, it has come off victorious as a competent instrument with which to take the specific gravity of milk. Prof. C. F. Chandler, President of the New York Board of Health, has testified in these cases, that the instrument is able to register the specific gravity of milk. Prof. Morton, of Stevens' Institute, said that 1.029 was a correct standard, and that a lactometer of that standard would give the specific gravity. Prof. Barker, of the University of Pennsylvania, testified that the lactometer was a good test for the specific gravity of milk; chemical analysis was the best way to test the *purity of milk*. The evidence all tends to prove the statement, that the lactometer will give correctly the specific gravity of milk; more than this it will not do.

As the lactometer of the New York Board of Health is used extensively in this State, it will be well to describe its construction. The scale of a hydrometer long enough to use in testing milk would be inconveniently long and the figures confusing. To obviate this, Dr. Chandler has made a scale for his instrument which is easy to read, and which gives an idea of the percentage of adulteration with water. A hydrometer stem is taken, and at a point equal to the specific gravity 1.029—which is the standard for pure milk—is marked 100, at the top of the stem, at a point equal to 1.000 (or pure water) the lactometer is marked 0, the intervening space being divided into 100 divisions; below one hundred, 30 degrees are marked off equidistant apart. "The point to which the lactometer sinks in the milk under examination, indicates the percentage of milk in 100 parts. Thus, if the instrument sinks to 80, the milk is 80 per cent. pure, and contains 20 per cent. added water." But this

assumes the original milk to have a specific gravity of only 1.029, which is lower than good milk.

The lactometer errs, therefore, in not showing the dilution of good milk down to our low standard, and consequently in reporting on a portion of dilution. If the lactometer is used in this State to detect adulteration and watering, the standard of purity should be fixed at a higher point than 1.029, or 100 of the New York instrument; for as previously stated the figure allows too wide a margin for watering. We hold to the opinion that in cases of suit, a chemical analysis should supplement the use of the lactometer; for if the specific gravity be raised by the addition of any substance like salt, caramel, etc., that instrument will not detect it. For rapid inspection the lactometer is of great service, and in a short time the inspector can examine many cans, easily selecting the pure from the impure, and in case of suspected adulteration a chemical analysis may follow.

2. *Chemical analysis.* As in the case of estimating the degree of watering by the lactometer, an arbitrary standard of purity must be fixed on before any conclusion can be arrived at by a chemical analysis.

The law of Massachusetts fixes a chemical standard of purity. It reads: "In all cases of prosecution, if the milk shall be shown upon analysis to contain more than 87 per cent. of watery fluids, or to contain less than 13 per cent. of milk solids, it shall be deemed, for the purpose of this act, to be adulterated." Massachusetts, then, has fixed a standard of purity. There is no question to be debated in case of suit as to the inspector being an expert, for he turns the sample over to the State analysist and the latter decides on the character of the milk. This method makes the question an easy one to decide in case of suit, and the discussion as to the accuracy of the lactometer, or any other instrument is avoided. This abitrary standard has been determined on from analysis made by Sharples, Babcock and other chemists. There is here, however, a wide margin allowed for milk of a poor character, and this margin is in favor of the milkman. We give the result of an analysis of pure milk from ordinary cows for the purpose of showing that 13 per cent. of total solids is a fair standard by which to judge the milkman:

Analyst.	Number of Cows.	Total solids.
Sharpless	22	14.49.
Babcock,	8	14.55.
Vaughn,	58	14.08.
Newton,	24	14.26.

If the State of New Jersey demands that a chemical examination be made to determine the degree of adulteration, a course which we favor, it would be well to adopt the standard of Massachusetts; this will allow dairymen to sell milk that will represent a fair degree of purity, and, at the same time, be equitable for both sides.

We do not wish to take the space requisite to discuss, at length, the various chemical manipulations used in milk analysis. The special works on the subject must be consulted. We will describe, however, the method we employ to determine the amount of water and milk solids: The sample to be analyzed is thoroughly mixed; 5 *Grams* of the milk are accurately weighed out in a tarred platinum dish, this is placed on the water bath and allowed to evaporate for three hours; the dish is carefully dried and weighed; the loss in weight will equal the amount of water, and the weight is that of the total solids. This method is more accurate than where the milk is measured with a pipette.

3. *By estimating the per cent. of cream.* This method is very inaccurate; the separation of cream is influenced by the temperature and various other factors. The cream glass used is a graduated tube, the graduators being from 0 to 20, as a rule; the milk is placed on the glass and allowed to stand at a temperature of 55° F., or 60° F., for twenty-four hours, when the per cent. is read off.

A very rapid and easy method—at the same time accurate—for getting at the amount of fat, and hence the degree of dilution with water, is the lactobutyrometric process. The process is much used by Prof. G. C. Caldwell, and is described by him in the "First Annual Report of the Cornell University Experiment Station."

We have employed the method by using a burette instead of the ordinary apparatus, and have found the process accurate and very satisfactory. The results correspond very closely with those obtained by chemical analysis. We insert a description of the instrument, and the process by Prof. Caldwell, as it is of

great intent to dairymen, not to mention chemists. The process is peculiarly useful in butter and cheese factories.

"A simple, and at least tolerably accurate method of testing milk, which shall not only give some idea of its quality, but shall also detect adulteration or skimming without fail, is acknowledged by all to be one of the great desiderata, especially in butter and cheese factories. * * * * A method of examination of milk, by which such information may be gained, that requires no expensive apparatus, and is easy and quick in execution, is found in Marchand's lactobutyrometrical process, as more recently modified by two German chemists, Schmidt and Tollens; in their hands, its indications came nearly always within 0.2 per cent. of the truth, and usually much nearer than that. In the case of thirty-nine determinations of fat in milk of all degrees of richness, made by the chemists just named, in no instance was the difference between the result obtained by this method, and by the most accurate chemical method, greater than 0.2 per cent., and in all but fourteen tests it did not exceed 0.1 per cent.

In twelve cases the two methods of analysis gave almost the same results.

DIRECTIONS FOR THE USE OF THE INSTRUMENT.

"Into the lactobutyrometer, a glass tube closed at one end and provided with a graduated scale near the open end, put, first, exactly ten cubic centimeters of the milk; this is done by filling the pipette marked *milk* with the milk to be examined, up to a short distance above the mark on its neck, by suction at the upper end while the point is dipped in the milk, then removing the pipette from the mouth and quickly closing the open end with the ball of the fore finger before enough milk runs out to bring the level below the mark; then remove the point of the pipette from the milk, wipe it off, and holding the instrument with the other hand so that the mark on its neck is on the same level with the eye, slowly and slightly raise one side of the finger closing the opening till the liquid begins to drop out at the lower end; when the level of the liquid just reaches the mark, close the opening again, hold the point of the pipette in the mouth of the lactobutyrometer and remove the finger from the upper opening; when all the milk has run out, allow about a

minute for the pipette to drain while held in the same vertical position, and finally blow out the last drop that remains adhering to the narrow opening below; during this operation it is best that the lactobutyrometer should be supported in an upright position so that it will not be necessary to hold it, and both hands will be free to manage the pipette; and care should be taken not to touch the sides of the tube with the point of the pipette, lest some of the milk which should go into the tube may remain adhering to its mouth.

Ten cubic centimeters of milk being thus transferred to the tube, next put into it exactly ten cubic centimeters of ether, with the aid of the pipette marked *ether*, then close the mouth of the tube with the cork that accompanies it, and, grasping the lower end of the tube in one hand and the upper end in the other with a finger over the cork to keep it in place, give the contents of the tube a vigorous shaking, carefully lifting the cork two or three times to allow vent for the ether vapor that accumulates in the tube. When the liquid presents the appearance of a uniform creamy consistency, without any visible clots, remove the cork and add, by means of the pipette marked *alcohol*, exactly ten cubic centimeters of this liquid, close the tube again and, at the same time, pour some of the alcohol, to the depth of about half an inch, into the saucer at the base of the brass cylinder, which also accompanies the apparatus, and which has previously been three-fourths filled with water, and set fire to this alcohol; while the water is thus being heated, give the contents of the tube another vigorous shaking in the same manner as before, with the same precaution in regard to opening the tube two or three times, till all the coarse clots formed when the alcohol was added are broken up, and the contents of the tube present a uniformly fine granular appearance. When the temperature of the water in the brass cylinder reaches 40 to 42 degrees Centigrade (104 to 108 degrees Fahrenheit,) blow out the flame of the burning alcohol, and put the lactobutyrometer in this warm water. The solution of fat immediately begins to collect at the top of the liquid; when, after five or, at most, ten minutes, no more fat globules appear to rise, and the layer of the solution does not increase in thickness, the lactobutyrometer is put in the glass cylinder which has already been nearly filled with water at a temperature of 20 degrees Centigrade, or 68 degrees Fahrenheit;

the fatty layer will become turbid and generally increase slightly in thickness, and finally, in a few minutes, it becomes clear and is then ready for measurement.

The number of the degrees is then read off on the scale on the tube, at which the lowest part of the meniscus or hollowed surface of the liquid stands, and also the degree at which the lower level of the fatty solution stands, where it meets the liquid below it, and from which it is distinguished by a sharply marked line; substract the second number from the first; search for the number expressing this remainder in the column headed *ether fat solution* in the following table, and against that figure in the column headed *per cent. of fat* the corresponding per cent. of fat in the milk will be found."

(The table will be found in the report referred to.) A full description of the process may be found in the report.*

We now pass on to the consideration of other adulterants.

2. *Sodium carbonate and bicarbonate.* An excess of alkalinity would lead us to suspect the addition of these substances. Evaporate the milk to dryness, incinerate the contents of the dish and to the ash add an acid. If carbonates be present effervescence, due to the liberation of carbonic acid gas, will ensue.

3. *Borax.* Evaporate to dryness, incinerate and test for boracic acid in the ash.

4. *Magnesium and potassium carbonates.* Test for carbonates in the ash.

5. *Sugar, caramel.* As the process for determining these substances is somewhat lengthy we refer to special treatises on analysis. (See the *Analyist*, March, 1880, p. 37.)

6.—*Salt.* Evaporate the milk to dryness, incinerate the contents of the dish. Taste the ash, an excess of sodium chloride is easily discovered. Test for excess of chloride with a standard solution of nitrate of silver.

7.—*Potassium nitrate.* Test for nitrates in the ash.

8.—*Turmeric and annatto.* Coagulate the casein with alcohol or an acid, filter and add caustic potassa to the whey. If turmeric is present the yellow color becomes brownish. If annatto be present a red color is given.

*The instrument is made by Childs & Jones, Utica, New York.

9.—*Flour, etc.* Flour, starch and arrowroot give the characteristic blue color when tincture of iodine is added to the milk after boiling. The microscope will detect the starch granules if the milk has not been boiled.

10.—*Gum-tragacanth, gum-arabic and dextrine* are detected by alcohol which, when added to the whey, causes a precipitate of flakes to fall.

11.—*Chalk.* Let the milk stand in test-tube. If any considerable quantity of chalk is present it will precipitate. A drop of acid added to the precipitate will cause effervescence.

12.—*Gelatine.* This will coagulate on boiling and settle to the bottom of the test-tube.

13.—*Glycerine.* (see Blyth, p. 49).

14.—*Brains.* Detected by the microscope.

D.—EFFECTS OF IMPURE MILK ON THE HEALTH.

It is our purpose in this section to consider the effects resulting from the use of skimmed and adulterated milk. Milk from diseased cows as a cause of disease in man will be dwelt on in another section.

Skimmed milk is milk deprived of its most nutritious ingredient—the fat. Hence, to expect such an article of food to be as nourishing as rich milk, would be folly ; nor would one hope to have a child thrive on milk that had been diluted with water, or otherwise adulterated. We have seen that skimming and watering are almost the sole methods of tampering with milk, and that other forms of sophistication are rarely met with in this country. If we leave diseased milk out of consideration, for the present, we will have to look to impure milk, as above described, as the great factor of mal-nutrition. Feeding a child on milk bereft of its most nourishing ingredient will result in starvation.

In order to have an infant thrive well on cow's milk, the composition must be as nearly like human milk as possible, and any disturbance of the normal relations of the various ingredients must be avoided, or derangement of the child's health will almost certainly follow. The fat, the casein, the sugar and the salts, must be given in natural proportions, or harm will result. Skimmed milk is deficient in fat while it contains an excess of casein. A diminution in the quantity of cream will be followed

by wasting; an excess of casein will cause gastric and other troubles; while too little of the salts may cause serious changes in the bony framework. Cream is the most digestible form of fat. "It will often be found in practice, that the addition of a little more cream to the baby's food will correct any mild indigestion, due to an excess of casein." (*Wiggin.*)

The principal and most fatal diseases of infancy are those characterized by wasting, that is the system loses its fat. Adipose tissue will not accumulate in the system if health is impaired, or if fat is not supplied from without, in the food. Wasting is a sign of defective nutrition. Now, if we try to nourish a child on skimmed or watered milk, fat in insufficient quantities is supplied, wasting results, death may follow; or, in other words, the child is starved.

"Of all the deaths that occur in the great cities of North America, from a quarter to a third take place under one year of age, and from two-fifths to one-half under five; out of one hundred live-born children, about twenty-five die before the end of the first year of life, and from forty to fifty before reaching the close of the fifth year." (*Curtis & Jarvis.*)

Milk being the principal article of diet in infancy, we naturally turn to that period of life to find the effects of impure milk; and it is just at that period of life that we note the highest mortality. Thousands of children perish annually from starvation, due to feeding on skimmed and watered milk. "The skimming and watering of milk—the darkest feature of which is the increase in the rate of infant mortality thereby caused—should be stigmatized as a grave crime; and the offender, when brought to light, should be subjected to some severer penalty than a paltry fine. Once let it be understood that the perpetrator shall be subjected to some ignominious punishment, proportionate to the offence, and, what is now considered as a trivial misdemeanor, will henceforth take rank among the imper missible as well as forbidden offences." (*Nichols.*)

That infant *morbility* and mortality are increased and caused by the use of impure milk, is no idle fancy; that poor milk is a factor, is proved almost daily in the practice of physicians having much to do with children's diseases. Where is the physician who has not seen cases of slow starvation of infants, resulting from the use of this inferior milk? The merest tyro in medicine accepts these facts as proved beyond doubt.

It is not long ago that three children died of starvation in the practice of Dr. Da Costa, of Philadelphia. The cause of death was found in the milk which analysis proved to be skimmed and then watered one and one-half times*.

Authorities and instances might be cited at great length to prove the truth of these statements, but our space will admit only of the bare mention of facts as given.

Is it not time, then, that the sale of this impure food was stopped? The sale will go on, despite legislative enactments, till checked by energetic health officers in our towns and cities, and to them the public look for relief.

E. MILK FROM DISEASED COWS MAY CAUSE DISEASE IN MAN.

It is conclusively settled that many of the diseases of cattle are transmissible through the milk, and it is indeed fortunate that this secretion diminishes or disappears in many of the diseases of animals; notably anthrax.

Tuberculosis, without doubt, may be carried into the human system, by the milk from cows sick with that disease. In a cow which was sold to be killed, Pench recognized the existence of phthisis. Milk from this cow was fed to pigs and rabbits. These animals thus fed, when killed showed tuberculous lesions in the lungs, intestines and elsewhere. The experiments made were quite conclusive and proved, without doubt, that tuberculosis is transmissible from the cow to other animals by means of the milk.

Experiments similar to these, made in Germany, and by Burdon, Sanderson and Wilson Fox in England, also prove that tuberculosis can be carried and will produce disease in healthy animals when the milk or flesh of these animals is used as food. Tuberculosis is a very common disease in cows, especially when they are improperly housed or fed. The stables in our cities should be closely watched, as the danger of transmission is a real one, and proper precautions should be taken to check the sale of milk from cows sick with phthisis.†

---

* Amer. Journ. Med. Sci. July, 1880. p 271,

† Vide *Med News and Abstract*, Sep. 1880, p. 533; *Br. Med. Journ.*, July 31, 1880; *N. Y. Med. Journ.*, Vol. III, pp. 241 and 321. "Tuberculosis of milch cows and the contagiousness of Tuberculosis, etc.," A. N. Bell, Am. Med. Ass'n, 1877; Forc., p. 484; Blyth. *p. 54 et seq.*

Milk from cows affected with the foot and mouth disease (Aphtha Epizootica) when taken into the system, is the cause of serious ill health. The disease is an exceedingly contagious one prevailing among cattle and other animals. The following train of symptoms follows the ingestion of milk from these animals; loss of appetite, nausea, accelerated pulse, swelling of tonsils and submaxillary glands, an outbreak of vesicles upon the lips and tongue. The lower extremities are covered with a peculiar cutaneous eruption.*

The results of analysis and microscopic examination of milk, from cows affected with this disease, are given in *The Analyst*, May, 1878, in an article entitled "Diseased Milk," by C. Heisch, F. C. S.

Pleuro-pneumonia is a very common disease among cattle, but the secretion of milk is, as a rule, checked in the early stages. Hence there is little possibility of it being used as a food.

The subject of transmission of diseases from animals by means of the milk is as yet in its infancy, the literature being small. But investigations are being made in Europe and in this country, and all published statements prove that it is extremely dangerous, to human life and health, to use the milk from diseased cows as food.

A source of sickness not mentioned above is found in the milk from cows secreted just after calving, and called colostrum. This produces diarrhœa in children. The microscope will detect colostrum corpuscles in such milk.

Milk contaminated with pus from an inflamed udder, or an abscess of the udder, will cause stomatitis and diarrhœa in infants.

It is hardly necessary to extend this section beyond these few hints; sufficient has been said to warn persons against the use of milk from cows not in perfect health.

F.—FEEDING INFLUENCES THE HEALTHFULNESS OF MILK.

That a healthy cow allowed to feed on rich meadow grass, and in the evening carefully housed, cared for and given a diet of meal and hay, will yield a rich, creamy milk, is evident; and that a child fed on this milk will keep in good health, grow fat

*Blyth, p. 56, *et seq.*; 2nd annual report of Mass. State Board of Health.

and prosper, is equally plain. On the other hand, we know that a sickly cow, fed on distillery swill, improperly housed and cared for, will yield a thin, watery milk; and that a child fed on such milk will lose health, have diarrhœa and waste away. These facts are almost self-evident; so patent are they that it seems hardly necessary to mention them. Yet, they are ignored daily, and people wonder at the mortality among infants in our cities. Let us examine the subject a little more minutely.

The influence of different kinds of food on the yield and quality of milk is an interesting question to the dairymen, from a business point of view. But, to us, as physicians and sanitarians, it is of vast importance as affecting public health. The consideration of the subject, in its commercial aspects, is foreign to the purposes of this paper; readers desiring information on this branch of the topic are referred to the admirable works of Flint and Thomson; to the reports of the agricultural boards of the various States, and especially to the reports of the Secretary of the Massachusetts Board of Agriculture.

It is our intention to look at the subject as a sanitarian, and see what foods do render the milk unhealthful. Great service would be done the State, if the subject was thoroughly investigated, for the attention it deserves has not been given to it. Many of the diseases of infancy are undoubtedly caused or aggravated by milk from cows fed on poor or unwholesome food. The length of this paper would be unnecessarily increased, if we were to devote the space to the subject that it deserves; we must content ourselves, then, by giving a few hints, with the hope that better and more thorough work will be done by another. We have selected for consideration points not touched on in books and not generally known to the public.

Brewers' grains. So much has been said in the public papers about this that it deserves our attention. Not much information can be obtained from books, as to the effect of milk from cows fed on brewers' grain, on the health of children, but little has been written on the subject. There is, however, a strong popular impression that the milk thus produced is unhealthful, and that health of infants is compromised or endangered by its use.

During the past spring and summer, we have taken pains to consult with farmers in all parts of the State, as to the effect on the health of cows by using this substance, and have accumu-

lated evidence from about seventy sources. The facts thus adduced will be noted further on.

This substance is obtained from breweries. After the barley is "malted," the malt is crushed, placed in a tub with hot water, and an infusion made. During these processes much of the starch in the barley is converted, by the action of diastase, into sugar and dextrine, and these substances go into solution. This infusion of the soluble parts of the malt is strained off, and the insoluble portions are sold under the name of brewers' grains, or beer grains. Beer grains, when dried, contain about ten per cent. of water, fourteen per cent. of albuminoid, twenty-one per cent. of sugar, thirty-two per cent. of starch, and six per cent. of fats.

Dr. Voelcker, of the Royal Agricultural Society, says: "Brewers' grains are much more nutritious than their appearance seems to warrant. Even in the wet condition in which they are obtained from breweries, they contain a fair proportion of ready-made and flesh-forming matters. Dried brewers' grains make good milk, and are fully as valuable, as a food for cows, as barley meal. It is the custom among our farmers, on account of cheapness, to feed this substance to cows, either alone or mixed with meal, hay, or other fodder. In some parts of the State, large quantities are purchased at one time, and stored on the farm, in pits and barn-cellars. The grains are generally wet, and if not used immediately, or if improperly cared for, they ferment, become sour, and in a short time, rot. When given to cows in a sour or rotten state, they cannot but be injurious, and produce poor milk. The evidence given by farmers proves that fresh beer grains, given in small quantities, mixed with other food, are not unhealthful, and that the milk produced is of good quality. When used to the exclusion of other food, or in a fermented state, the milk produced is thin and watery, with a small per cent. of cream; but the quantity is increased. The grains seem to act as a stimulant to the mammary glands, exciting the secretion of milk. As a rule, it increases the quantity, but impairs the quality. The opinion among the better class of farmers is, that the milking life of the cow is shortened by the use of this food, and that its use should be discountenanced.

As to the effect of milk thus produced on the health of

infants, there is great uncertainty of opinion among physicians, and it is believed that the use of this milk is followed by diarrhœa and wasting. One physician of note asserts that it is a fruitful cause of eczema in children, but as this disease is very common in childhood, even when the infant is fed on breast milk exclusively, this statement cannot be accepted as positive.

Distillery swill. Swill milk is rarely heard of now, but not many years ago it was a fruitful cause of disease and death in children. Fearing that the lessons of the past may be forgotten we are constrained to mention it as a possible cause of disease. Distillery swill "if properly fed in limited quantities, in combination with other and more bulky food, may be a valuable article for the dairyman, but if given, as it too often is, without the addition of other kinds of food, it soon affects the health and constitution of the animals fed on it. Where this forms the principle food of milch cows, the milk is of a poor quality; it contains, often, less than one per cent. of butter, and seldom over one and three-tenths or one and one-half per cent. Its effect on the system of young children is, therefore, very destructive, causing diseases of various kinds, and, if long continued, certain death." The adulteration of pure milk from the healthy cow by water, though dishonest and objectionable in the highest degree, is far less iniquitous in its consequences, than the nefarious traffic in "swill milk," or milk produced from cows fed entirely on "still slops," from which they so become diseased, after which the milk contains a subtle poison, which is as difficult of detection, by any known process of chemistry, as the miasma of an atmosphere tainted with yellow fever or cholera. The fact is sufficiently palpable, that no pure and healthy milk can be produced by an unhealthy and diseased animal, and that no animal can long remain healthy that is fed on an unnatural food, and treated in the manner too common around the distilleries of many large cities." (*C. L. Flint, pp.* 144, 208, 216.)

Where swill-milk was sold in New York, a few years ago, "it was found different in alimentary character from that produced by cows that were fed on grass, hay or grain. It was not so well digested in the stomach, nor had it the nutritive power to create flesh and sustain strength. The children lost flesh and failed to gain it. Their skins were pallid, sometimes discolored and corrugated. Their countenances had the appearance of old

age, rather than the bright and lively bloom of childhood. They suffered from diarrhœa and dysentery and great debility, and many died." (*Jarvis.*)

Fortunately, no "swill-milk" is sold in this State at the present time, but it is well for health officers to be on the lookout for it. The sale of it is, in this State, considered a misdemeanor, punishable by a fine of fifty dollars and imprisonment for thirty days. The laws of Massachusetts, New York, Michigan and other States also forbid its sale.

Various plants, when eaten by cows, affect the taste and color of milk. It is well known that turnips and wild carrots impart a very unpleasant taste and odor. The poison oak, (*Rhus Toxicodendron*) when eaten by cows, so affects the milk that it is almost a poison to children. When a child takes this milk, there is extreme weakness, vomiting, a fall of temperature, the tongue is swollen and dry. *Parkes.*

The taste of milk is altered by cows feeding on the following plants: wild turnip, charlock, rape, wormwood, ramsons, cypress spurge, hedge hysop, black hellebore, German chamomile, maize. Color is imparted to milk by the following: Yellow bedshaw, madder and species of carex, scirpus, equisetime, ranunculus. Euphorbia gives a reddish color, and the milk is made blue by alkanet, water violet, purple cow wheat, perennial mercury, common knot grass, buckwheat, yellow rattle. (*Calder.*)

G.—MILK AS A VEHICLE OF CONTAGION.

That milk will act a carrier of the germs of contagious diseases is proved beyond doubt. Epidemics of typhoid fever and scarlet fever, occurring in England, have had their origin in contaminated milk.

An epidemic of typhoid in the town of Eagley, England, was investigated by the medical inspector of the Local Government Board. It was found that a small brook had been used by the mill operatives so that large quantities of fecal matter were daily emptied into the stream. It was also found that one of the workmen was ill with a disease supposed to be typhoid fever. The water from this brook was used at a dairy and was the only supply in use. There was no positive evidence that the milk was diluted with this water, but it was acknowledged that the milk cans were washed with it. Of fifty-seven families supplied

with milk from this dairy, fifty-five were attacked with typhoid fever. About one hundred and forty-six persons were sick with the disease. The inspector says: "Not one household, to which the milk was traced, did I find free from the disease."

An epidemic in Islington, England, was also traced to milk diluted with contaminated water, as the cause.*

Scarlatina. In an epidemic of scarlet fever in South Kensington, England, it was observed "that one of the first severe cases which initiated an epidemic, occurred in the house of a milkman whose wife milked the cows, the milk being supplied to about twelve families in the city. In six of these, cases of scarlatina occurred in rapid succession, at a time when the disease was not epidemic, and without any communication having taken place between those that became affected and the persons who brought the milk. It is very probable that, in this instance, the milk was the carrier of the contagion, as, previous to the distribution to the several consumers, it had stood in a kitchen which before had been used as a hospital for a scarlatina patient."†

English public health reports and medical journals contain many instances like the above. The danger, then, is a real one and the public should be warned in time to avert any such epidemics in this country.

H.—LAWS BEARING ON THE SUBJECT OF OUR MILK SUPPLY.

The dangers to public health arising from the use of adulterated, skimmed and diseased milk having been pointed out, it will be well for us, now, to review briefly the character of the various State laws having for their object the regulation of the trade in this article. We can then the more readily point out the imperfect or inefficient parts of these laws.

The first act on our statute books is that of April 7th, 1875, which reads:—"The sale or keeping of adulterated milk is a misdemeanor, punishable by a fine of $50, and imprisonment for 30 days. To adulterate milk, or to keep cows for the production of marketable milk in an unhealthy condition, or to sell milk as pure milk from which the cream has been taken are also

*For full accounts of these epidemics, see 8th Annual Report, Mass. State Board of Health; *Practitioner*, Vol. XVII, p. 225; Vol. XI, p. 234; *Med. Times and Gaz.*, Nov., 1870.

†*Practitioner*, Aug., 1876, p. 155; Oct., 1877, p. 307. 9th Annual Report, Mass. State Board of Health.

punishable as above. The addition of *water or any substance* is defined as an adulteration. Milk from cows fed on distillery waste (commonly called "swill") is declared impure and contrary to this act."

This law is a public health measure and aims to secure for the people a supply of pure, healthful milk. If the mere enacting of a law could do good, this act would be all that was necessary. But it has remained on our statute books for more than five years, inoperative and is practically a dead-letter. We doubt if a suit or conviction has been had under it. Many reasons may be found for this law not being enforced.

It fails to reach the great mass of petty offenders in our larger cities. Citizens will not take the time necessary to follow up a suit, nor will they, if fraud is really detected, act as complainants. The fines are too low, if we consider the enormity of the crime, which is looked on only as a misdemeanor. Besides all this, no standard of purity is fixed by law, on which to base degrees of sophistication.

If we were allowed to modify this act so as to make it practical we would suggest the following alterations:—The burden of its enforcement should be placed where it belongs, on the public health officers in the towns and cities, and they should be held responsible for carrying out the requirements of the act. The fines and imprisonment should be made proportionate with the crime committed; we think the public is endangered by the sale of impure milk, and the crime should be punished by a heavy fine and long imprisonment. A standard of purity should be fixed by law, and officers, competent to determine the degree and character of adulteration, should be appointed to make analyses for the health officers in our towns and cities. We have stated in a previous section what that standard should be.

The milk act should be a part of a general law against the sale of adulterated food of any kind.

The other laws, bearing on the subject, are purely trade measures, and have for their object the prevention of dishonest competition in the milk trade, and are not intended to guard the public against unhealthful milk. These laws read as follows:

Act of April 5th, 1878: Every person who shall sell, or who shall offer or expose for sale, any milk from which the cream, or

any part thereof, has been removed, shall distinctly and durably stamp or mark, in letters not less than two inches in length, in a conspicuous place, above the centre, upon the outside of every can, vessel, or package containing such milk, the words "skimmed milk," and such milk shall only be sold or shipped in or retailed out of a can or other vessel so marked.

Violations of this act are punishable by a fine of $50. The sale or exposure for sale of milk contrary to this act is presumptive evidence. The non-payment of the fine is punishable by imprisonment.

Act of March 12th, 1880,—supplementary to the above act: The State Milk Inspector is appointed and empowered to open any can, vessel or package containing milk, whether sealed or otherwise, or whether in transit or otherwise; and if upon inspection he shall find such can to contain milk which has been adulterated, or from which the cream, or any part thereof, has been removed, the inspector is empowered to pour the contents of the can upon the ground, and bring suit against the person violating the law.

Any citizen may act as complainant under these acts.

It may not be amiss to look at the objects and bearing of these last two acts. Prior to the passing of the act of 1880, which created the office of milk inspector, there were laws, which, if enforced, were sufficient to check the sale of impure or adulterated milk; but the great trouble was found in having them enforced, consequently they were practically inoperative.

The history of these acts is pretty much as follows: The sale of milk was greatly interfered with by unprincipled dealers in different parts of the State, who shipped inferior or watered and skimmed milk, and obtained prices as high as those received by honest men who sent pure milk. To check this fraud, the act of April 5, 1878, was passed. This act, a purely commercial one, had for its sole object the prevention of dishonest and unfair competition. The law, which was copied from that of New York, was on the statute books for years, and not a single suit was brought under it, no person being found to act as complainant; the law being a dead letter for two years, it was thought, by the milk producers, that if some one person was appointed to look after their interest, at the expense of the State, the objects sought for would be obtained.

In accordance with these views, the act of March 12, 1880, which is supplementary to the previous one, was passed, and the office of State Milk Inspector created.

The two last acts protect the public against the sale of skimmed milk to a slight extent only. We have previously remarked that the supply of our cities comes from farms in their vicinity and not a large quantity from distant points, and that the bulk of the milk produced by dairymen is shipped to New York, hence the interests of our people in this case are secondary to those of the people of New York City.

We have, then, laws perfectly competent, if enforced and if modified to a slight extent, to check the sale of impure milk, in this State. It is not for us, in an article like this, to criticize the laws; it remains for others to alter the laws so that they cover the ground.

I.—INSPECTION.

We have thought it well to draw up a short scheme for the use of milk inspectors in making systematic examinations. A man to act as an inspector, must be a good judge of milk and, without the aid of any instrument, he should, from the taste, odor, consistence and appearance, tell whether the milk is a specimen of genuine milk or not. If he use the lactometer, this knowledge is especially necessary, for the lactometer is useless except in the hands of an expert. He must be conversant with the workings of the milk business, from the time the milk leaves the the cow to the time it is delivered to the consumer. He should likewise know the "tricks of the trade." It is well to be provided with a lactometer and lactometer glass, a floating thermometer and a number of four ounce bottles in which to put the samples.

Scheme.—The taste and odor should be noticed; upon rubbing the milk between the fingers it should give the feeling as if it had "body." Now stir the milk well, and take a sample from the centre of the can and put it in the lactometer glass; take the temperature if necessary; apply the lactometer; watered milk will run between between 80° and 105°; skimmed milk may mark from 110° to 125°. If suspicious, take a sample and label the bottle with all marks on the can and the date. An analysis may be made as follows: *Analysis.*—Take the specific gravity

in a 100 gram bottle; set for cream in a cool place and read off the per cent. in twenty-four hours, and notice any sediment.

Thoroughly mix the sample and weigh out five grams in a tarred platinum dish; evaporate on a water bath for three hours; dry and weigh. Loss in weight equals water; weight, less the weight of dish, equals total solids. Extract fat with ether or benzine; the loss equals the fat. Now ignite and when the dish is cool weigh; weight equals the ash

Test for adulterants, sodium, potassium and magnesium carbonates; borax, potassium and magnesium nitrate; sodium chloride; chalk, etc. The casein and sugar may be estimated after the fat is extracted, but this is rarely necessary.

Take a fresh sample and examine under the microscope. Note starch grains, blood corpuscles, pus corpuscles, colostrum corpuscles, Blyth's bodies, etc.

J—BIBLIOGRAPHY.

ANALYST, THE—This periodical is the organ of the "Society of Public Analysts" and contains, scattered through the various numbers, many articles on milk and its analysis.

BELL, J. C.—Milk Analysis. *Analyst*, Dec., 1879.

BLYTH, A. W.—A manual of Practical Chemistry; The Analysis of Foods, etc., London, 1879.

————Milk of the Cow in Disease. *Analyst*, Vol. I, 1876.

BURDON—SANDERSON.—Hand-book for the Physiological Laboratory, Vol. I, p. 536. *et seq.*, Philadelphia, 1878.

CALDER, E. E.—Reports of Inspector of Milk for City of Providence, 1879, 1880.

CALDWELL, G. C.—Testing Milk with the Lactobutyrometer. First An. Rep. of Cornell University Experiment Station, p. 58.

CHANDLER, C. F.—Johnson's New Universal Cyclopædia. Article "Milk."

CURTIS, T. B.—Infant Mortality. Treatise on Hygiene and Public Health, Vol. II. N. Y., 1879.

FLINT, A., JR.—The Physiology of Man, Vol. II, p 77, *et seq.* N. Y., 1873.

FLINT. C. L.—Milch Cows and Dairy Farming. Boston, 1874.

FOX, C. B.—Sanitary Examination of Water, Air and Food. London, 1878.

GUENON.—A Treatise on Milch Cows. N. Y., 1879

HASSALL.—Food, its Adulterations and the Methods for their Detection. London, 1876.

HEISCH, C.—On Diseased Milk. *Analyst*, May, 1878.

HILL, A.—Milk Standards, *Analyst*, May, 1876.

HOPPE, SEYLER.—Handbuch der Physiologisch Analyse, Berlin, 1875.

JACOBI, A.—Infant Diet. N. Y., 1874.

JARVIS, E.—Infant Mortality. Fourth An. Rept. Mass. State Board of Health.

LAW, J.—The Lung Plague of Cattle. Ithaca, 1879.

LEEDS, A. R.—Adulteration of Food, etc. Third An. Rept. N. J. State Board of Health.

MARCHAND.—Nouvelle methode de dosage du beurre dans le lait (Lactobutyrometer,) Jour. Pharm. et chim. 3e serie t. xxvi, p 344.

MOTT, H. A., JR.—The Adulteration of Milk. N. Y., 1878.

NICHOLS, A. H.—The Adulteration of Milk. Fourth An. Rept. Mass. State Board of Health.

NORMANDY.—The Commercial Handbook of Chemical Analysis. London, 1875.
PARKES, E. A.—A Manual of Practical Hygiene, etc. 4th Ed. London, 1873.
PAVY, F. W.—Treatise on Food and Dietetics. Philadelphia, 1874.
REPORT of Commissioner of Agriculture. Washington, D. C., 1878.
REPORTS, Massachusetts State Board of Health. Second, fourth, eighth and ninth.
REPORTS, Milk Inspector City of Boston.
REPORTS, Milk Inspector City of New York.
The *City Record*, August 24th, 1876; March 11th, 1880.
REPORTS, Secretary Massachusetts State Board of Agriculture. Nos. 26 and 27.
REPORT, Pennsylvania Board of Agriculture. Article, "Lung Plague."
SHARPLES, S. P.—Adulteration of Food, in Vol. II, Treatise on Hygiene and Public Health. New York, 1879.
Specimens of Milk from the vicinity of Boston. Proceedings American Academy Arts and Sciences. Vol. XI, p. 149.
Milk Analyses. Proceedings American Academy Arts and Sciences. Vol. XII, p. 98.
Milk Analysis. Proceedings American Pharmacentical Association, 1876.
SMITH, EDWARD.—Foods. N. Y., 1873.
SMITH, EUSTACE.—The Wasting Diseases of Infants and Children. Philadelphia, 1871.
THOMSON.—Researches on the Food of Animals. N. Y., 1875.
VŒLCKER.—On Milk, its Supply and Adulterations. Phar. Jour., 3d series, 1874.
WANKLYN, J. A.—Milk Analysis. N. Y., 1874.
WIGGIN, O. C.—Artificial Feeding of Infants. 2nd An. Rept. Rhode Island State Board of Health.
WIGNER, G. W.—On some recent cases of Diseased Milk. *Analyst*, May, 1878.
YOUATT AND MARTIN.—On Cattle. N. Y., 1877.
The People *vs.* Schrumpf. This contains the argument of the counsel for the New York Board of Health in favor of the lactometer.

CONTAGIOUS PLEURO-PNEUMONIA.

EZRA M. HUNT, M. D.

It has been the duty of the Secretary of the State Board of Health, for the past year, to have frequent correspondence with those who have to do with the diagnosis of contagious pleuro-pneumonia, and to aid in its investigation in this State. Few diseases of animals are as interesting as this is in its comparative study. It requires the acute analysis applied to the various zymotic diseases and needs to be traced also for the light which it may possibly throw upon epidemics. While a specific disease, it results almost exclusively in a local affection, so that it has to be treated much as a disease of the respiratory organs. Its one great lesion becomes the absorbing thought in the study of the disease, although this must not be to the exclusion of its study as to its constitutional effects. This is made all the more significant by the fact that inoculation in the flesh, as upon the ears or tail, not only will give the specific disease, but divert its concentration from the lung and at the same time secure immunity from attack. It is made benign, not so much by the local mildness, as is sometimes demonstrated by tailless cattle, but because it is thus diverted to another centre for its activity.

Without repeating the history of diseases, or relying entirely upon the text-book authorities, we purpose to seek an answer to the following questions:

Have the laws of its contagiousness or communicability been determined?

Are its lesions so distinct as that its diagnosis from all other forms of lung diseases can be determined from post-mortem appearance alone?

Do the thermometer or symptoms distinguish it from other lung diseases of cattle?

How are we to arrive at its diagnosis as an infectious pleuro-pneumonia?

What is the period of its incubation?

Can an animal that has fully passed the acute stage and returned to feeding, to milking and to apparent health, communicate the disease?

Question 1st.—Have the laws of its contagiousness or communicability been determined? It is first to be noted that much which is accepted as proof of contagion is not really such. Terms such as epizootic (epidemic) infectious, transmissible, etc., are confounded.

The secretions of a cholera patient or a typhoid fever patient may communicate the disease, but the person not, or neither may communicate and yet the secretions after voidence, standing and change, i. e. after a number of hours more or less may communicate the disease.

Or, as it is claimed in yellow fever, the patient may be harmless, while the things and surrounding (fomites) may communicate the malady.

Or, a disease may be in the atmosphere so that there is what is called an epidemic constitution of the atmosphere.

Or, like cerebro-spinal meningitis, it may prevail, not because one animal catches it from another, but because numbers are subjected to the same unfriendly influence.

Dysentery often prevails as an epidemic or endemic when it is not contagious.

The pathology of puerperal patients, so far as the peritoneum is concerned, is the same as the non-infectious form.

So a great deal of the average testimony as to the contagiousness or communicability of a disease, needs to be sifted and treated, not by the test of prevalence, or of seeming confinement to localities, but by close and exact evidence as to individual communicability.

It is generally believed by authorities that the form of pleuro-pneumonia of which we write is communicable from animal to animal, and also by the surroundings of infected animals. Although classified and tabulated facts arrived at by such methods of exclusion as exclude other possible sources of prevalence are too scarce as yet. The common sentiment and obser-

vation of veterinarians concludes it to be communicable through contagion.

The lines of its contagion are not very well defined. We have good reason to believe that most contagions are particulate, i. e. not gaseous but consist or reside in minute particles. Most of these are diffused slowly. The yellow fever poison seems to cling near the ground, and scarlet fever poison is not communicable to the same distance as measles.

There is some reason to believe that the ferment of the lung plague is not very diffusive, and that animals two hundred or three hundred feet distant are not in the area of the poison.

Are the lesions so distinct as that its diagnosis from all other forms of disease, or of local affection can be determined from the post-mortem appearance alone?

To an observer of a post-mortem where an animal is killed with pleuro-pneumonia and has one sound lung, the contrast at once convinces of something—one lung is say of two and a half pounds weight, the other cf twenty to thirty pounds. There is effusion of a liquid—there is a thickened pleura, both of the part next to the chest wall and of that covering the lungs. There is plastic exudation, both inter-pleural (L) and in the interstices of the connective tissue, which leads to organization and so gives to you all the solidity of fibrinous exudation. It is just this that constitutes the pathology or lesion of the disease. "All the other organs of the body are, as a rule, found to be in a state of health." There is variation in the amount and consistency of the watery or gluey fluid, after the plastic exudation so rapidly organizes as to bind down the pleura and lung so that you need to peel it from the chest wall.

The pneumonia is chiefly interstitial and magnified because of the abundant connective tissue in the cattle. Neymeyer's definition of interstitial pneumonia (vol. i, pp. 162 and 192) as an inflamation, involving the walls of the air vesicles and the inter-lobular connective tissue, "is fully descriptive as to kind." Only the amount is magnified because the bovine animal has so large an amount of connective tissue in the lung, and because the "pneumonic lobules are separate blocks of tissue." By the exudation and by the conversion of the inter-lobular tissue into granulative tissue and connective tissue, the lobules themselves pass to a stage of stuffing or impaction, and so you get necrosis or a strangulated death of the lung substance.

If the animal does not die, but goes on to recover, the dead portion of the lung becomes encapsulated or encysted by "the false membrane over the pleura, and the inter-lobular and peri-bronchial spaces."

Now in all this, as to the pathology of the lesion, so far as quality or method of change is concerned, we have nothing pathonomonic or distinctive of an infectious or contagious malady. As we read or study, side by side, the various changes that take place in pleuro-pneumonia, or chronic interstitial pneumonia, in the adult and in the animal, the terms of description and the records of lesion as to the character of the exudation, its organization, changes and results, it is hard not to come to the conclusion that Leaning does, that if there is a contagious pleuro-pneumonia in animals there is also an analagous infectious pleuro-pneumonia in adults, and between the two, as he finds them in the adult, he makes only such pathological distinctions as these. In one, the pneumonitis is the principal lesion; in the other, the inter-pleural plastic exudation. "He makes the essence of distinction to consist in the more excessive and intense hyperplasia of the blood, its tendency to throw out plastic or fibrous exudation being such that "wherever there is celluloid connective tissue there is plastic exudation."

While the medical profession generally recognize cases of common pneumonia, to which all these facts attach, it is significant that they regard it not as a contagious disease, although, at times, largely prevalent, but as a severe and malignant type of usual pneumonia, which is also generally a pleuro-pneumonia.

While some veterinarians have asserted to us that it is possible from the post-mortem lesions of the lung alone, to pronounce a case one of infectious pleuro-pneumonia, yet on presenting the specimens to five of the most eminent pathologists of New York City, three of whom have examined cattle lesions also, they plainly declared that while from the rapid plastic or pleuritic exudation and its "tremendous" rapidity of solidification, there might be grave suspicion and inference that the disease was specific, yet that the same pathological order of change was common and not distinctive. The very points that had been named to us as differential, where shown not so to be by those who believe in a contagious pleuro-pneumonia.

"Some have supposed the very extensive exudation into the

lung structure and its marbled appearance, are indicative of some specialty in the inflammatory process; this is not, however, the case, for it is found that ordinary pneumonia, caused by cold, induces the same anatomical condition of the pulmonary parenchyma—the peculiar appearance being due to the anatomical fact, that the lungs of horned cattle contain much connective tissue and that the air cells are separated into groups by such connective tissue."

Prof. Williams, of Edinboro', in his Principles and Practice of Veterinary Medicine, quotes Strangemayer with approval, thus:

'All this, however, is not intended to and does not discredit the idea of contagion. The same structural or tissue changes occur to an organ from causes totally different. So pneumonia, arising from very different causes, does not have lesions corresponding to the variety of causes. Puerperal fever, although so distinctly communicable, so far as the peritonitis is concerned, has no distinct lesions. Although the pleural adhesion and infusion are marked, yet common pneumonia is generally pleuro-pneumonia.'

Loomis has said that in pneumonia nothing is so frequent as adhesion of the lung to the pleura.

Prof. Janeway states, that in one hundred and twelve cases of post-mortem of pneumonia, only ten were found entirely free. While there is a field for the comparative study of the lesion, it is not chiefly as to its pathological distinctness.

The degree of lesion, the habits of the disease, the natural and physical signs and evidence of the source of contagion, must be sought as diagnostic. Then the effects of imparting the disease to other animals by inoculation from the diseased lung as a crucial test, are worthy of consideration. Where all such facts are weighed, studied and compared, we have the greatest respect for conclusions, but we must claim that from post-mortem appearances *alone*, it is seldom wise to assert a positive diagnosis. And we must also say, that diagnoses have sometimes been made with a facility and celerity appalling to any medical clinican.

Does the thermometer distinguish the contagious pleuro-pneunomia from all other diseases of cattle, and especially those in which the lungs are affected? The thermometer is merely a test

of animal heat, and as such is valuable only as a measure thereof. An excessive degree of temperature attaches to very many diseases and to none more than those of the lung. In the common pneumonia of men, it is not unusual to record a heat varying from 104° to 107°. If we find in a stable an accurate record for days of the heat, as in our hospitals, or as in the note book of private chemists, and are sure that with care as to thermometers and with all that precision which is so difficult with animals, and so exacting on the time, and nice observation of the attendant, that the record shows a very high temperature, this would aid in giving precision to the diagnosis, but not so as of itself to establish the disease. In a case in Camden county, in which nine animals died, the temperature was as high as 107°, but there was no lung lesion whatever, and the disease was not pleuro-pneumonia. How, then, is a diagnosis of the disease to be arrived at?

We have only to answer that it is by the history of the cases, the ability to trace the source of contagion, the natural and physical signs, the spread of the disease and the post-mortem appearances, by a summing up of all the facts in evidence. The rapidity of the fiterinous exudation and interstitial consolidation is an important index. An influenza, like the horse epizootic, may prevail and pneumonia may be epidemic without being contagious when real infectious pleuro-pneumonia is occurrent. There may also be cases of sporadic disease among cattle. The infectious disease is claimed never to occur spontaneously in this county, but always to originate from a previous case. If, therefore, there is no clew to contagion, it needs strong evidence to assure as to the specific nature of the disease. It is easy to arrive at a superficial diagnosis, and positive conclusions are made by men whose evidence would be cast out of any capable medical or veterinary court as incomplete.

WHAT IS THE PERIOD OF INCUBATION?

The period of incubation has not yet been accurately determined, but must be admitted to reach from ten to forty days, as a rule. We believe we have evidence of its occurrence three months after the purchase of an infected animal. This is the great difficulty in eradicating the disease. An animal may easily pass in an ordinary inspection, and yet be a conveyancer of

the disease. It is for this reason that we regard the usual inspections, as they have always been conducted, entirely insufficient to guard against the disease. Acute cases only are likely to be discovered, and drovers soon become wise enough not to bring these over by usual routes. While there should be full powers of inspection, this cannot be the sole or chief reliance. So long as pleuro-pneumonia exists in any part of any State, every man who brings any cattle in the State, should be required to define the locality from which they came, and give a certificate of health, and be held accountable for any outbreak in the animal for three months. All newly-purchased stock should be kept apart from the common herd. Any slight cough or other ill condition of health should be carefully watched.

Can an animal that has fully passed the acute stage, and returned to feeding, milking, and to apparent health, communicate the disease?

This is a most important question, since, over and over again, a quarantine has been continued, because of the assertion that recovered cattle are still dangerous. It has been assumed that any animal having once had the disease, may at any time after apparent recovery, become the focus of a contagion, and so infect other cattle. It is assumed that because an animal once affected, may continue to have one lung, showing that there has been disease in it, that, therefore, the "capsule walling up the diseased germs may break down, and the imprisoned germs escape, and so another outbreak occur." We submitted that point to an eminent medico-veterinary authority, who replied: Who saw the germs? Where is the record of one fact that any such case ever did break down and release imprisoned germs? Because a part of a lung becomes necrosed and encysted, that does not prevent recovery. We constantly have similar conditions in human recoveries. Nor does a lesion retain the specific character of the disease causing it. Caseous degeneration, or necrosis, or other changes resulting, are in fact always quite distinct from the original cause thereof. The suggestion that such animals may, at any time, become foci of contagion, is not supported by evidence.

Dr. Yeo, one of the best of recent authorities, says: "The exudates do not tend to become highly organized, but to change to a cicitricial tisssue, or degrade into lower forms of matter, i. e.

caseous or calcareous." We have seen, the last summer, cases which had been pronounced pleuro-pneumonia, and had recovered with signs of consolidated or necrosed lung; yet they were kept in close stables, and with numbers of other cattle. After a lung has thus passed into a necrosed or cicatricial state, there is no probability that by any outbreak it can again become the centre of a specific contagion. The reason why we advise the fattening and slaughter of recovering cases, is rather because there is danger of infection during the prolonged recovery, and because milch cattle are not likely to do as well with one lung, or a part thereof, permanently impaired. It would, at least, be worth while that some of these lungs which had been harmless for months or years, should have some of their juice inoculated into other animals, to see whether genuine infectious pleuro-pneumonia could be produced.

What are the laws and restrictions that are justifiable, and on what kind of evidence must the claims for their enactment rest?

We first claim that it is due that the presence, degree and type of infectious pleuro-pneumonia should be established by the most indubitable evidence, before severe restrictive measures are resorted to.

It is no longer enough that this or that authority give their opinions. They must state the grounds and evidence of their opinions so that other experts, too, may sift the facts and draw their conclusions. Or, at least, they must by former subjection to such tests have established their claims to speak *ex cathedra*.

We believe, therefore, first of all, that all states should in the case of this or other suspected contagious disease among animals, have its constituted authorities, with power enough to find out and decide and with diligence enough to give the grounds of their conclusions, in order that there may be reasonable evidence as to suspected contagions.

On satisfactory evidence thus furnished that any contagious disease among animals exists, isolation should be promptly secured, and such authority be granted as the communicability of the disease justifies.

It is important after such methods of test as are due alike to science and art and due to the owners and to their individual rights, that large powers should be given, since upon full authority and its exercise may depend the entire question of spread.

The rule in all contagious diseases is to give large police and sanitary powers and then hold officers accountable for their judicious execution. The man who always exercises power mainly because he has it, or who hesitates to exercise because of the opposition of interested parties, cannot be entrusted with such a law.

Large powers are only meant as discretionary powers, and where exercised beyond a limit which the facts in evidence justify, no class so abuse and misuse power as those who are largely entrusted therewith. The very confidence thus reposed in them is a declaration of a belief that they will act only upon evidence such as will be satisfactory to the common sentiment of experts which, in our country, always has, if not a full popular approval, yet a noble and sustaining constituency of those who are always ready to defer to the expressed statements, evidences and opinions of a majority of careful investigators.

Errors of judgment when they effect rights of property or life are as serious as if they were errors of financial cupidity or other ill-intent. This does not inculcate hesitancy in action, but it does include discernment both in resolve and execution and ability to defend action in a way satisfactory to the common intelligence of judges.

The peremptory slaughter of animals, their forcible detention and inspection in transfer, and the closing up of avenues of trade by summary ordinance are acts to be justified by the facts in evidence. Those that act promptly with good reasons, therefore, are to be commended; those who act upon grounds that will not stand the test of close examination are to be condemned, just in proportion to the magnitude of the trust committed to them. When a disease like pleuro-pneumonia is epidemic in any locality, large powers to prevent spread must be conferred and exercised. The welfare of animals is a large interest in the State.

The hygienic sanitary measures, necessary for their health and the prevention or limitation of contagious diseases among them, is among the clear duties of the State. It concerns not only a pecuniary or humanitarian interest, but bears directly upon the health of the people.

The laws which effect them are very similar to those that effect human health. It is found that the care of the one is quite a measure of the care to be extended to the other. In the matter

of epidemics, (epizootics) or contagions and the various laws of communicability or transmission, these diseases are of intense interest, since by these we may study all contagions.

It is evident to any one who examines a lung of an animal with acute pleuro-pneumonia, that it is so rapid in fibrous exudation and in interstitial consolidation, that the only hope of a case is in very early treatment and a profound impression upon the inflammatory and exudative process. Bleeding and large rapid doses of calomel, and later, counter-irritation after removal of the hair, need exact trial under testing methods. Milk, with lime water and defibrinated blood, may be easily and largely given by drench to meet any reduction from treatment which is less rapid than that from the disease. Cows' blood, stirred well while fresh, so as to remove the strings of serum, leaves a juice of great value for alimentation in such cases. If farmers would use such preventive treatment as we have indicated in circulars, and would have skilled veternarians examine affected herds, so as to see each case in its start, we are sure its extension could be limited.

In the last few years, biologists and pathologists and the medical profession have been most earnestly studying the laws of contagion and of the production, dissemination and virulence of disease, using comparative pathology and other comparative studies as a most important means of information. For this reason, in England and on the continent, medical men have been prominent as authorities on the disease of animals, and co-operate with educated veterinarians in their attempts to prevent disease. It is due to veterinary science and art that both alike take a very deep interest in these studies. It is due to the medical art that physicians utilize the large opportunities, thus furnished, for the study of the laws of health, of disease, of physiology and pathology, as they affect human kind.

We feel that in the study of the lung disease of cattle, of these blood poisons, and of such a disease as infectious pleuro-pneumonia, there is still a large field for investigation, in which, recently, such men as Dr. T. Spencer Cobbold and Dr. C. S. Roy, Dr. Leaming, etc., have added to the labors of Fleming and Williams and Law.

As pleuro-pneumonia, like most of the contagious diseases of

animals, does not, thus far, admit of much treatment, the chief service that the State can be is as follows:

1st. To diffuse information that shall enable owners to suspect contagion, and so separate the animals before others are infected. Also to acquaint them with methods of disinfection and disposal and of avoiding the carrying of the disease.

2d. To prevent the irresponsible introduction of cattle from infected districts, by inspection, by regulative laws, and by holding sellers responsible.

3d. To provide means for the disposal of animals that have the disease, so that centres of contagion may not be preserved.

4th. To guard against modes of keeping cattle which tend to cause ill-health and diseased milk supply.

5th. To authorize inoculation under State oversight in herds already affected where it does not readily subside.

The present law, with slight alterations, can be made operative for these purposes, and at moderate expense, unless sudden outbreak or introduction of a contagious disease should require especial expenditure. The details as to its former management and some other suggestions will be found in the record made for the Board of Agriculture, and published in their report for this year as required by the law.

REPORTS OF VETERINARY INSPECTORS.

REPORT OF WM. B. E. MILLER, D. V. S., DECEMBER 31st, 1880.

The subjoined report will show the number of places visited where diseased animals were reported, the number sick at time of inspection, the nature of the disease, and deaths resulting therefrom as far as known:

March 24. Visited Benjamin J. Lord's farm, Parkville, Gloucester county; found no chronic cases of pleuro-pneumonia. Mr. Lord had lost several, and had one killed by Gen'l. Sterling's order.

March 30. Found one animal sick with bronchitis in a lot of fat steers. Examined at the Camden stock yards. The animal was slaughtered by J. L. Pierson, butcher, of Woodbury, Gloucester county.

April 1. Visited E. A. Bloomfield's farm, Elizabeth, Union county; found one chronic case of pleuro-pneumonia. Had lost some and had others killed by the cattle commission of last year.

Same date. Visited Jacob C. Dodd's, farm Lyons Farms, Essex county; found three chronic and one acute case of pleuro-pneumonia. Had lost some and had some killed by previous commission.

April 2. W. Cohen, Old Small-pox Hospital, Hoboken, Hudson county. One sick, had lost some and had others killed by other commission.

April 2. Mrs. Schuler, Blun street, Union Hill, Hudson county. One chronic case. Had some killed by previous commission.

April 5. Found three sick steers in a lot of forty. Inspected at the Camden stock yards. Were slaughtered for beef. Came from West Philadelphia stock yards.

April 14. Visited Bergen county; found one chronic case—

on one of the farms where cattle had been killed by the previous commission. Informed myself as to other herds which had previously been in quarantine.

April 6. Visited Manasquan, Monmouth county, and examined a cow on the farm of J. H. Morris; found it an acute case of pleuro-pneumonia. Lost one on the 18th and one on the 19th of February; had no other cattle. Also visited the farm of Shem Pierce, of the same place, and found one sick with same disease; had lost one three weeks previous.

April 16. Mr. McMullen, Jersey City, Hudson county; one cow sick of parturient apoplexy; died.

May 12. John Whittick, Hightstown, Mercer county, had two infected with pleuro pneumonia from herd of J. C. Fisher, on adjoining farm, who had several deaths and some killed by the State authorities last year. No deaths in Whittick's as far as known.

May 14. Joel Barkalow, Forked River, Ocean county, lost one cow with pleuro-pneumonia.

June 28. Visited Englishtown, Monmouth county. John H. Laird had one cow sick; had lost one from indigestion.

Same date. William B. Congden lost one from parturient apoplexy.

Same date. George Morris had three sick with indigestion; no deaths as far as known.

June 29. Visited Freehold, Monmouth county. Abijah Applegate lost five cows within a few days of each other; did not think it any contagious disease. None sick at time of visitation.

July 1. Visited Farmingdale, Monmouth county. Many farmers were losing cattle from indigestion, owing to the dry weather. Found no contagious disease.

July 2. Visited Ridgway, Lakeview, White's Bridge and Toms' River, and found that nearly every farmer had lost cattle as the result of the excessive drought.

July 19. Visited Robertville and Matawan, Monmouth county, and found the same state of affairs as at other parts of the country—cattle dying by the dozens from indigestion.

July 20. Visited Mount Holly, Burlington county. J. Ewing had five cows sick with lung trouble; had lost two.

C. H. Deacon had two sick with pleuro-pneumonia; killed one at this visit; had lost some before; has since had many *others killed* by State Board.

The disease was brought to this farm by the purchase of a cow from Caleb Ridgway, cattle dealer, that came from the stock yards of West Philadelphia.

Mr. Gaskill and Mr. Southwick of Pemberton, both bought from same drove and had their herds infected. Mr. Kelley, of Masonville, also had the contagion brought to his herd from the same source, and had several killed.

July 26. Dr. Ashhurst, of Mount Holly, had one sick cow which was killed. Not pleuro-pneumonia.

July 28. Visited Clayton, Gloucester county, and examined the herd of E. J. Davis and others, found three cases of pneumonia.

September 8. W. R. Hylton, Wrightsville, Camden county, had four sick with pleuro-pnemonia, has lost or had killed thirteen in all, infected by a cow from Philadelphia stock-yards.

September 9. Visited Turkey, Monmouth county. One farmer had lost two cows; found three more sick.

September 13. Visited Rieglesville, Warren county; found hog cholera very prevalent. The mortality very great.

October 1. Visited Mount Holly and examined two horses for glanders.

October 15. Visited Mount Holly and slaughtered two horses belonging to Ashmead Deacon, previously condemned for glanders.

October 11. Visited Sicklerville and Williamstown, Camden county, and found hog cholera very prevalent and fatal. Two cattle had died from phthisis pulmonalis verminalis.

November 1. Visited M. C. Brownings, Ellisburg; found one sick cow; had lost one. Made several subsequent visits to this farm; lost nine cattle in all. Disease "typhoid fever."

November 5. Visited Mullica Hill, Five Points and Ewans' Mills; found two farms infected with pleuro-pneumonia. Edward R. Lacy lost two steers, and had two more sick with it. Mr. Heritage lost one. They purchased these cattle from a drove which came from the Philadelphia stock-yards about three weeks before.

December 7. Visited Salem county; found pleuro-pneumonia on three farms, one death had occurred, and one was slaughtered at the time of visitation, and a post-mortem made of the carcass. These animals all came from one drove recently brought from Philadelphia. No other deaths since, as far as I know.

December 9. Visited E. Tomlinson's, Kirkwood, Camden county. Found one steer sick with pleuro-pneumonia; slaughtered the animal, and made a post-mortem, which showed the lesions of the last stages of the disease. Revisited this place on the 12th, and found another sick, which was slaughtered immediately These cattle were purchased in West Philadelphia about six weeks before, and came from West Virginia for sale.

Your obedient servant,

WM. B. E. MILLER, D. V. S.

To E. M. Hunt, Secretary State Board of Health.

BURLINGTON COUNTY, STATE OF NEW JERSEY.

MOUNT HOLLY, January 15, 1881.

Gentlemen:—I have the honor to inclose for your information, a report of the disease known as contagious pleuro-pneumonia, in my district during the present year:

It first made its appearance on the farm of Mr. Caleb Wilkins, Fostertown, Burlington county, N. J., June 9th, 1880. He had bought the cow of Mr. Caleb Ridgway, Vincentown, Burlington county, N. J., the preceding March. She died June 11th, 1880. She had been separated from the herd as soon as found ailing, and the rest of his herd did not contract the disease.

I was next called, June 21st, 1880, to inspect a cow suffering from contagious pleuro-pneumonia, on William G. Deacon's farm, near Mount Holly, N. J. She came from the same drove about the same time. Mr. Deacon has lost sixteen head. The same day (June 21, '80,) I condemned a case for the Hon. Job H. Gaskill, on his farm near Ary's Mount, Burlington county, N. J. He also bought two cows from Mr. Ridgway's infected drove last spring. He has lost ten head.

Mr. Joseph Kille, Masonville, Burlington county, N. J., bought a cow of Mr. Ridgway, some time in March, and on the 25th day of June, I condemned her and three others, as suffering from this malady. He has lost seven head.

Mr. H. H. Troth, Rancocas, Burlington county, N. J., called me to inspect his herd on the fourth day of August, 1880. I condemned two cases, and one cow had died prior to my visit, he not knowing it to be the cattle plague. He bought two cows of Mr. Ridgway, from the drove. He lost seven head.

Mr. William E. Gaskill, Juliustown, Burlington county, N. J., called me September 4, 1880. Condemned one cow. We suppose his cows took the disease from Mr. Job H. Gaskill's, as they pastured in adjoining fields before Mr. Gaskill's herd was quarantined. He has lost seven head.

Mr. Joseph Lundy, Rancocas, Burlington county, N. J., pastured his cows in an adjoining field to Mr. H. H. Troth's, in the early part of the summer, and during the month of September, 1880, lost three cases.

Mr. Rowland Stokes, Rancocas, Burlington county, N. J., pastured some young stock on an unfenced meadow near where we had Mr. Troth's cows quarantined. Two of his heifers jumped in and mingled with the diseased ones; and November 26th, I slaughtered one heifer for him, making in all eight herds affected. Slaughtered by order of State Board of Health, forty-four head; died of the disease, seven head. Total loss, fifty-one head from June 9th, to December 7th, 1880. One other cow, not seen by me, on the farm of Daniel Emley, Mount Holly, was slaughtered by order of State Board of Health. Although the disease appeared in a very malignant and contagious form in this county, we seem to have it under control at present; but we must be vigilant, and adopt all precautionary measures to stay its progress. We were fortunate enough to not allow it to spread from farm to farm after we were apprised of its appearance, by our system of quarantine, except, in the one instance of Mr. Stokes' cattle, above mentioned. Mr. Caleb Ridgway, Vincentown, Burlington county, N. J., bought the drove in question, from a man in a Philadelphia stock-yard, not knowing them to be diseased, and sold them to the farmers in our vicinity. Thus this fatal disease spread, causing our farmers to suffer great losses. Regarding the causes, symptoms, different stages, &c., of the disease, it does not seem necessary to occupy any space in my report. After infection, death is the only remedy that will stop its progress.

One of the Township Boards of Health reported two cases of glanders, which were slaughtered by order of the State Board of Health.

Respectfully submitted by your most obedient servant,

C. K. DYER, D V. S.

REPORT OF J. A. MC'LAUGHLIN, D. V. S.

JERSEY CITY, JANUARY 1ST, 1880.

E. M. HUNT, M. D.,
Secretary, Board of Health of New Jersey.

SIR:—According to request I submit the following statement of work done by me since my appointment as cattle inspector.

June 9, 1880. Went to farm of Mr. Teese, distant about three (3) miles from Elizabeth, Union Co., found four (4) cases of pleuro-pneumonia contagiosa. Destroyed two (2); quarantined the remaining two (2).

June 25. Went to Mr. Donovans, Jersey City, Hudson county, found one suspicious case.

July 20. Examined eleven (11) head of Holstein cattle, at the Bremen pier, Hoboken, said cattle imported from Holland and the property of B. B. Lord, of N. Y.. All perfectly healthy.

August 11 and August 16. Went to Lower Hackensack, New Barbadoes; cattle the property of Mr. Gross. Found one cow suffering from *simple* pneumonia. After a thorough investigation concluded that contagious pleuro-pneumonia was not on his (Mr. Gross') farm.

September 8th. Went to the farm of Mr. Theo. F. Young, Andover, Sussex county. After a thorough investigation convinced myself that contagious pleuro-pneumonia was not among his herd.

September 16th. Went to the farm of Cooper & Hewitt, Mr. George, agent, Charlotteburg. After a thorough investigation satisfied myself that contagious pleuro-pneumonia was not among his cattle.

October 21st. Went to Preakness Valley to farm, (Old Stag Farm.) Found one sick cow showing other symptoms than those attending contagious pleuro-pneumonia. Found, also, one (1) cow on which I held a post-mortem. Conclusion arrived at: No contagious pleuro-pneumonia.

December 22. I examined two hundred and seventy head of Western cattle about to be exported per steamer "Persian Monarch," (agents Patton, Vickers & Co.) I mention this casually as showing the increasing business with the foreign markets, the result of increasing confidence, and none of these had any apparent disease.

VARIOUS CIRCULARS.

ISSUED BY THE NEW JERSEY STATE BOARD OF HEALTH, AND COPIES OF LAWS ENACTED BY THE LEGISLATURE, BEARING ON HEALTH, VITAL STATISTICS AND THE CONTAGIOUS DISEASES OF ANIMALS.

PROTECTION TO BATHERS.

JUNE 1, 1880.

Our statistics show that from July 1, 1878, to July 1, 1879, one hundred and ninety-three persons were drowned in this State. Some at the sea-shore, or by the capsizing of boats, some in ponds, many while bathing in rivers or small streams, some in pools or cisterns. Many of these were good swimmers. Not all of these perish from real drowning. Some have heart disease made fatal by nervous shock, others apoplexy or some intense congestion, others syncope from exhaustion. It is not easy to decide on the moment whether the drowning is from any of these causes, and it is better to proceed on the supposition that the case is one in which death *has occurred* from the shutting out of the oxygen of the air. Cases where the hands are clasped and the fingers contracted are the most hopeful. "Those capable of inhaling and retaining a large amount of air in the lungs, and those who retain their presence of mind in the greatest degree, are those who resist the dangers of submersion for the longest time and are the most readily revived, while those who force nearly all the air from their lungs at the first shock can seldom be recovered."

"When a person falls into the water or is exhausted by the act of swimming, he goes beneath the water, then again comes to the surface, aided by the buoyancy of the air in the body and in

the clothing. In coming to the surface, realizing danger, he instinctively assumes the upright position, springs from the surface, and throws up the arms for help, at the same time endeavoring to relieve the desire for breath, by an inspiration, and to express the desire for aid, by calling out. This effort takes in water as well as air, and produces a slight spasmodic cough during which act the body goes beneath the surface the second time. As the consciousness of sinking becomes more acute, there is an agonized expression of the countenance which is indescribable, but which, when once seen, will be ever remembered and recognized—and at the same time frantic efforts are made to grasp everything that can be seen, whether within reach or not, and this desire continues even after having sunk, as oftentimes bodies are found clutching the weeds, grass, or stones, that may be found at the bottom of the water."

"Sometimes the air is so exhausted from the system that the body does not come to the surface after going down the second time, but generally there is sufficient inflation to bring it once more to the surface, when as soon as the head comes above the water, the urgency to take the breath has become so great that a full inspiration is made without due caution, and a large quantity of water and a small quantity of air are taken into the system. The water penetrating into the bronchial tubes produces a second fit of coughing, expelling what little air may be left, and the body sinks just below the surface or goes to the bottom."

Five minutes under water is the usual limit after which recovery is improbable in a case of drowning, but as there is not always the same amount of air exclusion, as the time cannot always be accurately stated, as syncope or nervous shock may have modified the lung and air condition, and as there may be slight inhalation of air before it is perceived, no case not known to have been *under water* half an hour should be regarded as hopeless. Persons have been recovered who for an hour have shown no outward sign of life. Places frequented by boys for swimming, and all bathing places and life-saving stations, should have definite provisions for such accidents, and should be required by their patrons each year to state precisely what these appliances are,—and to show that they are in perfect order for instant use and under such direction as to be readily at hand. An accident *ought* never to occur without a full knowledge beforehand of *how* most rapidly to secure aid and appliances.

Printed guides in public places near the water serve both as information and warning. Methods and skill depend on speed for success. For details we refer to an article prepared for the New Jersey State Board of Health by T. G. Chattle, M. D., and to be found in our report of 1879.

In a case just occurring, the boat seeking the drowned one should have in it a person whose duty it is at once to take charge of the recovered body and not wait to land before doing anything.

When needing to be removed there should be at hand a stretcher on which to carry the body. Some one on the shore should be securing things needed.

The body should be carried with the face and front downward. One person each side with hands joined across the thighs, and with the others passed under the arm-pits to the head, will give the chest most freedom, and help to empty water, froth or mucus from the chest or stomach.

Discipline or readiness for the accident is the first and best promise of restoration. Order hot bottles, dry clothing, electric battery, hypodermic syringe or other provided apparatus to be brought and thus be ready with whatever the person directing may want.

HOW TO TREAT THE DROWNED; HOW TO SAVE A LIFE.

I. Cleanse the mouth and nostrils quickly and loosen collar, necktie and other clothing if you can, so as to get at waist and chest, but do not lose time at this.

Roll the body over upon the right side and so on over upon the face, the face resting on the bent right arm. Thrust your finger in at the angle of the mouth, and if you find the tongue fallen back, press or draw it forward. (The second or third finger of the other hand or a knot in a handkerchief will hold the mouth open while doing this if need be.) Then standing astride the body and clasping your arms around it so that the fingers of your two hands interlace just over the navel, raise the body by a slight jerk three or four times so that all but the head and feet clear the ground. This is to clear the stomach and windpipe, and will not take a half a minute.

II. Then turn the body on the back with the head as low as the body. Draw the tongue forward to one side of mouth and pass a lead pencil or stick as thick as the forefinger, in from the side

and across to the opposite back tooth, so as to keep the mouth a little open. (The stick will generally keep the tongue, or if not, it may be held.)

III. Then open the vest and the outer clothing so as to get nearer to the surface. If at hand, apply ammonia up the nostrils and inject with a hypodermic syringe a dram or teaspoonful of brandy or whisky every few minutes beneath the skin of the upper arm or shoulder, or let another do it while you work on at *artificial* respiration—

THUS: In order to fill the lungs with air, raise both arms slowly upward and backward until the hands are brought together directly over the head. Then, more quickly replace them at the sides.

To expel the air from the lungs:

Place one hand upon the navel and the other close above it; then press heavily upon the navel, at the same time with the other hand or fist push strongly inward and upward, taking off the pressure suddenly. Then repeat the arm movement, and so alternate on and on. One or two persons can do it.

Each time as the arms are drawn back dash hot water against the sides. During these movements some one else should wipe the hair with a towel and put on the head a dry woolen cap; take off the shoes and stockings and wrap the feet in warm flannel and apply the galvanic battery to the feet, thus aiding and yet not interrupting the work of the one in charge, who must be recognized as director.

If still there are no signs of life, *vary the arm movement*, and instead grasp the body around the chest and with the operator's arms under the patient's arm-pits, raise the body forward gently and quickly to a sitting posture, then lay it down again and press over the navel with the hands as before, and alternate by this method about six or eight times per minute and continue according to indications.

The galvanic battery is best applied to the side of the neck and chest walls, but at first, time must not be lost from these systematic efforts to induce artificial respiration. Lose no time, yet do not hurry so as to lose regularity, and do not wait for anything you may want.

Warm rubbing, warmth, ginger tea, hot coffee, champagne or wine, beef tea and egg should be ready for use if there is resusci-

tation and ability to swallow. A portable bed should be at hand so that in transfer to a building there may be no exposure but a recovery of animal heat. As some die in secondary shock after apparent revival, this must be guarded against by quiet, warmth, food and rest.

How to keep the tongue from falling toward the windpipe and so impeding respiration.

Feel with your finger where the tongue is when you put in the pencil or stick and press it down and forward. If you have no one to hold the tongue you need not hesitate to pass a large pin or a small hook through its end, which does no harm and can be passed on through afterward by taking the line off of it. If the stick is passed in at one angle of the mouth across to the back tooth of the opposite side, and raised a little, that pries open the mouth, and the tongue can be worked or pulled well forward or out at the angle of the mouth and held by a handkerchief over the fingers if need be.

How to use the hypodermic syringe.

Remove the nozzle and fill it with brandy or whisky as you would a small syringe. Pinch up the skin and insert horizontally so that it pierces through the skin. Then push the piston down till the barrel of the syringe is emptied of a teaspoonful. A physician may add to the first or second injection the $\frac{1}{50}$ of a grain of digitaline, or six drops of the tincture or three of the fluid extract of digitalis. A drop of the fluid in the syringe should always be forced out before insertion, so as to have no air forced in.

How to use the electric battery.

Have a small Faradic current battery. Mix a little water with a half teaspoonful of the bisulphate of mercury, or, if out of it, use any strong acid, and put it in the metal cup. Then see, by holding the tin handles, one in each hand, that the battery works strongly. Apply one handle closely at the side of the neck and the other at the pit of the stomach. Move the latter handle around and between the ribs of either side and at the ticklish points at each side under the ribs. A battery should be kept at every bathing place. Use it as early as you can. A good hand battery, such as Grenet's, can be had for ten dollars.

TO HOUSEHOLDERS, CITY AUTHORITIES, BOARDS OF HEALTH, ETC.

I. *Look to the Condition of your House.*—Begin at the cellar or basement. Have nothing there that can decay, or that causes foul odors. If damp, let in air or sunlight, or drain the surroundings if needed. If by cleansing, by whitewash or by repeated airing there is not agreeable air, speedily use some of the disinfectants recommended.

II. *Look to the Kitchen.*—Let all sinks be kept sweet by scrubbing—by hot water poured down each day, or by use of disinfectants if needed. If outside there is an opening to the air, so that the kitchen sink is not the chief air outlet to a cesspool or sewer so much the better. Be careful that all slops or offalling from kitchen or laundry work is soon conveyed away, or disinfected at once, and not made to become a part of any heap or mass of impure matter. Cleanness cannot come out of uncleanness. Such things rapidly vitiate air, and discomfort, sickness or death result. Dirty water of any kind is even worse than dry filth. Secure cleanliness if you would secure health.

III. *Have the Dwelling and Sleeping Rooms well aired each day.* Closed closets, unshaken bed clothing, windows open and curtains down will not secure rooms fit to live in, or sleep in. *Flush* the room with air and let this, with sweeping and dusting, remove the organic particles which otherwise constantly accumulate and cause foulness. Chamber slops and wash-water are very innocent if cared for within six hours, but soon after decompose, and in sickness or very hot weather, sometimes sooner. If there are water-closets or stationary wash-basins in your house, be sure that they are not the foul air inlets to outside cesspools or sewers. Have good traps, good outside ventilation, good caution as to smells and use disinfectants for temporary purposes until you can remedy radical defects. Look to unoccupied rooms and the attic so that all may be dried and well aired, and that you may secure as much coolness and ventilation above you as possible, and not have an unventilated hot air chamber near the roof.

IV. *Know as far as you can that your Water and Ice Supply is Pure.*—Use no water from wells where surface soil is foul or where organic matter can reach, or from cisterns exposed to foul

air, as water will absorb foulness. If the water has any odor while heating in a glass tube, or if it becomes turbid or emits odor on being shaken after being kept a day in a long glass bottle, half full and corked, at once suspect it. If you must use it, have it boiled, and when cool, air it by pouring from one pitcher to another, and use it thus until you can be satisfied as to the purity.—See in full our First Annual Report, pages 83-4.

V. *See that the Food supplied for your Family* is in proper condition before cooking, and that it is prepared in a wholesome way.

VI. *Look to the Out Door part of your Home and that it is kept in Proper Order—that no water or decomposing matters are thrown upon it.*

If there is a cesspool it must not smell where it is disconnected with the house or has access to the air. If it does, it must be disinfected until radical change can be made. If there is an ordinary outdoor privy have free access of air to it, and exclusion of all slop or rain-water from it. If there is odor from it, use odorless disinfectants until it is corrected. If too foul for use cover it over with "calx powder," and have under the seats some receptacle, such as the patent pail, or a half barrel, or tub, which can be frequently removed and alternately replaced by another. A privy built above ground, with water-tight receptacle, by the use of dry earth, powdered wood charcoal, dry sifted ashes and occasional copperas water, is easily kept neat and clean, if cleansed each spring and fall.

Country homes need inspection and circumspection. Their sanitary care is often greatly neglected by nice people.

VII. *Insist that your town, if you live in one, have thorough sanitary inspection.*—Where persons are housed closely to each other there cannot but be evils from which the community has a right to be protected, and yet from which each one cannot protect himself. There will be householders who, from thoughtlessness, ignorance or poverty, do not secure for themselves or for others the needed sanitary conditions. Charity, the public welfare, and the necessary incidents of city life require regulated and definite provision against all those nuisances which imperil the life and health of the populace.

Insist upon systematic prevention, instead of waiting for that

loss which disease always involves, when it is artificial, or when we are compelled to meet an epidemic hurriedly.

If your authorities do not act, move by voluntary associations which shall exhibit the facts and so compel action.

There is no waste so great as that of preventible disease, which disables not only the sufferers, but puts a tax on labor, capital and life much more direful than a well directed expenditure to prevent it. Epidemics are to be dreaded, but our greatest losses are from a chronic death and sickness rate which has a permanent base of supply in prevalent insanitary conditions, not prevented, not remedied as they should be and can be. Public health is common wealth. Can you not do something to reduce the tax levy which forced diseases impose upon the citizens of your city, township and State? To the degree that sickness and invalidism is unnecessary, it means hard times and ill-content. Every motive of comfort and interest requires that we plan to prevent all those ailments which are within the range and duty of our control.

DISINFECTANTS, AND HOW TO USE THEM.

Draughts of air for all floating foulness.

Dry rubbing for all easily detached foulness.

Wiping and water scrubbing for all attached foulness in most cases admit of no effective substitution.

Submersion in boiling water is applicable to the cleansing of all garments, utensils, &c., admitting of such a method; and dry boiling heat or freezing cold will also neutralize infective particles.

To disinfect a room, ship or building so needing disinfection that its contents and surfaces cannot be easily dealt with singly; close the room or building, its windows, doors and chimneys so as to exclude the outer air as far as possible. Vacate the house. Break roll sulphur in small pieces, place it on an iron plate or other metallic dish, and set this on a pair of tongs, or other cross-bar, over an iron pot in which there is water, or over a large box of sand, so as to avoid danger of fire from small particles of burning sulphur. Light it by a few hot coals or some alcohol poured around the sulphur and lighted. Then leave and shut the door *after* you. A pound and a half of sulphur is sufficient for 1,000 *cubic* feet of space. The sulphur will convert all the oxygen of

the air into sulphurous acid, and all organic particles are likely to be changed. Keep closed three hours after the burning has ceased, and then air well six hours before occupying. Clothing and bedding needing disinfection may be hung on lines and left in the room. Most furniture is not permanently injured, but needs dry wiping and then washing off afterwards.

Chloride of Lime.—A valuable disinfectant, chiefly because it contains from 30 to 35 per cent. of chlorine, which is liberated under proper methods of use. If purchased for cities, it should be tested as to the amount. It is not overrated as a disinfectant if only its quality is known, and its mode of use is judicious. It needs slight moistening, frequent stirring, and sometimes the addition of an acid, as vinegar or common spirits of salt. The test of its efficiency is that the odor of it be kept constantly perceptible.

Chlorinated Soda.—Usually known as Labarraque's solution, is a convenient liquid preparation, valuable for use in saucers in the sick room or in utensils. Its odor should be perceptible to strangers entering.

Lime—Plaster—Charcoal—Dry Earth—Sifted Ashes.—All these have value, chiefly to be tested by the rapidity with which they correct odors. Fresh slaked lime should be scattered in all places of foul odor. It or charcoal or plaster may be scattered over heaps emitting foul odors. Calx powder is made by pounding one bushel of dry fresh charcoal and two bushels of stone lime, and mixing them, and is of great practical use.

All these substances absorb foul gases and dry up moisture, and so help to retard decomposition, or else absorb its results. Where lump charcoal is used it may be refitted for use by reheating it. Quick lime and ground plaster should not be used where they may be washed into pipes and form lime soap or obstruct by hardening.

The Metallic Disinfectants.—Sulphate of iron (copperas or green vitriol), two pounds to a gallon of water, to be sprinkled freely in drains, cesspools, privy closets, soiled vessels, or heaps of decaying matter which cannot be removed at once. One half of the strength will do where it is to stand in contact with surfaces or in spittoons, water-closets, house vessels or vaults.

One half pound of sulphate of iron (green vitriol), or one ounce of sulphate of zinc (white vitriol), or one ounce of sul-

phate of copper (blue vitriol), or one ounce of chloride of zinc (butter of zinc), or one ounce of chloride of lime (bleaching powder), put to a quart of water—any one of these is available for neutralizing discharges or for sinks, used in quantities sufficient to cover the bulk they are intended to disinfect.

Soiled garments may be put to soak in a half pound of sulphate of zinc (white vitriol), to three gallons of water. It will not stain or discolor most fabrics. One ounce of chloride of lead dissolved in a pint of hot water, and then a pailful of water added, into which a handful of common salt has been thrown, serves a similar purpose. Also a half ounce of permanganate of potash to a gallon of water.

For washing, soiled garments should be put in boiling water, unless the character of the fabric forbids it. Powdered borax, one quarter of a pound to a gallon of water, is a good cleanser of clothing. Soiled hair, brushes, etc., are cleansed by it. Chloride of zinc, one quarter of a pound to a gallon of water, does not stain or discolor fabrics.

Parkes recommends two ounces of chloride of lime, or one ounce of sulphate of zinc, or one half of a fluid ounce of chloride of zinc, to be added to each gallon of the boiling water in which the garments are thrown. On clothing that cannot be washed, and does not need to be burned, after thorough shaking and airing, the sulphate of zinc or chloride of zinc solution may be sprinkled.

For general disinfection, the following compound is available and valuable, and far better than most of the patented articles offered:

Sulphate of iron (copperas), forty pounds.

Sulphate of lime (gypsum or plaster), fifty pounds.

Sulphate of zinc, (white vitriol), seven pounds.

Powdered charcoal, two pounds.

Mix well, and scatter dry or wet it in small quantities, and make into balls ready for use. Where a liquid is needed, stir in water in the proportion of a pound of the powder or ball to a gallon of water, and sprinkle where needed.

Carbolic Acid is valuable as an out-door disinfectant, to be added to the sulphate of iron solution or used separately. Because of its own odor we cannot well test its effect in correcting other smells. We would test specimens or use only Squibbs

Liquid, No. 1, because sure of its strength, to be diluted by adding from fifty to one hundred parts of water, according to the mode of its employment. It is seldom required if the other articles named are properly used. Carbolic acid and chloride of lime must not be used together.

Remember that we do not know that any chemical disinfectants destroy the germs of a disease.

They only neutralize or suspend the action of those artificial disease producers or fertilizers, which the bad administration of cities or householders, or interference with natural laws or neglect of cleanliness has provided. We are to rely on these palliatives or correctives only while we are preparing for radical methods of prevention.

N. B.—The only reason why the death rate of your city or your township is over 15 to the 1000, or why the sickness and invalid rate is a large multiple of this, is because you are the victims of nuisances which admit of abatement.

PRESENT WHOLESALE PRICES OF DISINFECTANTS.

Sulphate of Iron (Copperas, Green Vitriol), 1½ cents per pound.

Sulphate of Zinc (Vitriol), 6 cents.

Chloride of Lime (in bulk), 2 cents per pound; in packages, 6 cents.

Sulphur Roll, 2½ cents per pound.

Carbolic Acid (No. 1 Squibbs), 30 cents per pound.

Zinc and Carbolic Acid, disinfectant of N. Y. Board of Health, 40 cents per gallon.

Permanganate Crystals, $1.10 per pound.

50 per cent. solution Chloride of Zinc, 25 cents per pound.

Solution of Chlorinated Soda (Labarraque's), 10 cents a pound.

SANITARY APPLIANCES.

TRENTON, N. J., May, 1880.

In the practical applications of sanitary science, it has become necessary to use very many appliances, both for convenience and to guard against evils incident to household and city life. These inventions have become far more numerous and useful than is *generally known. To afford* the people a better opportunity to

become acquainted with their merits, both by personal examination and by the opinions of experts, the State Fair of New Jersey and the State Board of Health last year united in an exhibition of sanitary appliances. Although it was the first of the kind attempted in this country, it was so highly successful as to lead us to make it a permanent and prominent feature at this great annual gathering of our citizens. This fair is held for a week each year, only a few miles from New York City, near Newark, and on the direct route to Philadelphia and to the south and west. The attendance from this and other States is very large, and it affords the best opportunity for familiarizing the people with valuable improvements. It opens this year September 20.

Specimens, models or drawings may be sent either as competing for premiums or for exhibit. Every article should bear a descriptive label, containing detailed information respecting its construction, use, retail price, and the place at which it can be obtained. There is no charge for space. Facilities will be afforded for those who desire to show any apparatus in actual working. Articles must bear the name of the owner or agency exhibiting. The small cost of conveying goods to and from the fair must be borne by the exhibitors. Letters of inquiry may be addressed to E. A. Osborn, C. E., Middletown, N. J., or to State Board of Health, Trenton, N. J. Articles sent for exhibit in our care should be directed "New Jersey State Fair, Waverly. Care of New Jersey State Board of Health."

The State Board of Health has commenced at Trenton, the capital of the State, a museum of sanitary appliances, to which any owner or manufacturer may present the articles exhibited as the property of the State, for permanent examination and exhibit. Or they will, by us, be directed to the persons or agents with whom they are to be left.

ADDITIONAL FOREIGN CIRCULAR.

It is also our desire to secure from foreign inventors and dealers specimens of the most approved appliances. It is the best opportunity that can be afforded in this country for extending their sale. Already the foreign press has noticed some valuable features of our last exhibit. No pains will be spared to do full justice to each article sent. Any article donated will be placed *in the* Museum or disposed of as otherwise ordered. Persons *wishing* to establish agencies in this country will be directed to

responsible agents, who can furnish full reference. Any articles sent to our care, as herewith directed, may be consigned through Morris' express, 50 Broadway, New York, or through other agents. Expenses of transfer from the New York agency to the fair grounds will be paid for here. We can assure exhibitors of careful attention to the merits of each article.

By order of the State Board of Health.

EZRA M. HUNT, M. D., *Sec'y.*

☞Note.—The N. J. Express Co. delivers goods on the grounds.

OFFICE OF N. J. STATE AGRICULTURAL SOCIETY,

No. 764 BROAD STREET, NEWARK, N. J., May, 188 .

The Sanitary Exhibit of the New Jersey State Agricultural Society, which holds its Annual Fair at Waverly Park, on Pennsylvania Railroad, between Newark and Elizabeth, September will be under the superintendence of the New Jersey State Board of Health. In addition to the catalogue premiums in classes, we will also confer decorative medals for the best exhibit in each of the following groups:

1st. Ventilating and Smoke-consuming Appliances.

2d. Water-supply Apparatus, Filters, Sanitary Conveniences and Disinfectants.

3d. Sewage Conductors and Receptacles, Tanks, Cesspools, &c.

4th. Water-closet and Emptying Apparatus.

5th. Life and Labor-saving Apparatus.

A suitable building, supplied with water, is provided, and the actual working of ventilators and various other appliances can be shown.

It is intended to make this exhibit an attraction at our Annual Fairs, so that all may become acquainted with the best sanitary arrangements, and inventors and dealers have a good opportunity for comparing and testing apparatus. When necessary the Judges will order trial, and postpone award until satisfied.

WM. M. FORCE, Rec. Sec.	AMOS CLARK, JR., Pres't.
E. M. HUNT, M. D.	E. A. OSBORN, C. E.
A. D. NEWELL, M. D.	W. M. FORCE.
E. DUNN.	J. C. BAYLES.

PHINEAS JONES.

☞*Note—The N. J. Express* Co. delivers goods on the grounds.

LAW AS TO BOARDS OF HEALTH, VITAL STATISTICS, &c.

An act entitled "An act concerning the protection of the public health and the record of vital facts and statistics relating thereto."

1. Be it enacted by the Senate and General Assembly of the State of New Jersey, That every city or borough or incorporated town, or any town governed by a commission, shall have a board of health of not less than five or more than seven members, of which the keeper or recorder of vital statistics, and also one city physician and city health inspector shall be members, if there be such officer or officers; and the said board of health shall be nominated by the mayor and approved by the common council or other governing board of the city, borough or town, to serve for not less than three years, but not more than three of the number shall go out of office at any one time, unless in case of removal by death or change of residence.

2. And be it enacted, That all cities of over ten thousand inhabitants shall have one or more city health inspectors, who hereafter in any new board, or in any case of vacancy, shall be appointed by the board of health.

3. And be it enacted, That in each township of the state outside of city limits, the township committee, together with the assessor and the township physician, if there be such an officer, shall constitute the board of health for all of said township outside of any city limits, and shall have the same powers as are possessed by any city board of health within the state, so far as they could relate to any unincorporated district.

4. And be it enacted, That every local board of health of any city, borough, town or township shall, on or about the first of October of each year, in addition to any other reports that the local authorities may require, prepare an annual report of the condition of the public health in their district, stating, also, any special causes of deterioration of health or hazard thereto, and shall therein answer any inquiries which have been addressed to them by the state board of health; in the case of cities the same shall be presented to the city authorities, and the board of health *shall,* on or before October fifteenth of each year, forward a copy

of the same to the address of the state board of health at Trenton; and in the case of townships, a similar report, signed by the chairman of the township committee, shall, by the same date, be sent as herein provided for city boards.

5. And be it enacted, That boards of health of cities or townships or any county health board shall, through the keeper or recorder of vital statistics, take cognizance of any neglect of returns on the part of any persons charged with this duty under the laws of this state, and are authorized to pass ordinances additional thereto, and not conflicting with the same; and they shall have the same powers of action for neglect as is given to the state board of health, and in addition, in the case of the failure of any city clerk, assessor or physician to make full returns as required by law, may bring action for the same and recover for the use of said city or township to the amount not exceeding fifty dollars; and in case of the death or removal of any assessor before the time for electing a successor, the township clerk shall take charge of and report such returns until the election of an assessor.

6. And be it enacted, That the state board of health, in making inquiries and investigations in regard to the causes of disease and mortality and the modes of their limitation, may aid any local board to the amount of twenty dollars in any one year, and that for this purpose, and also for extending its own inquiries into the sources of physical deterioration or local causes of disease, the board be authorized to expend two thousand dollars each year, in addition to the amount heretofore provided, said expenditure to be accounted for each year by itemized bills, audited by the president and secretary of the board of health and approved by the governor, and then shall be paid as other accounts of said board.

7. And be it enacted, that the board of health of any borough, incorporated town or township, shall examine into all nuisances, foul or noxious odors, gases or vapors, or causes of ill health or disease that may be known to them or certified to them by three or more freeholders or tenants, as in their opinion injurious to the health of the inhabitants within their township, or in any such vessel within any harbor or port of such city, borough, town or township, and shall deal with the same as in the manner herewith directed, to wit: whenever such nuisance or

source of noxious odors, or cause of ill health or disease, shall be found on public property or on the highway, the person or persons officially in charge thereof as overseers, civil officers, directors or trustees, shall be notified to cause the same to be removed as the case may require; and if failing so to do the procedure shall be the same as hereinafter provided in the case of private individuals.

8. And be it enacted, That whenever such nuisance, source of foulness or cause of sickness hazardous to the public health, shall be found on private property, that the board of health of the city, town or township in whose limits it may be, shall at once notify the owner at his own expense to remove the same within such time as said board shall deem the public health to require, a duplicate copy of the notification being also left with one or more of the tenants or occupants; if the owner resides out of the state and cannot be reached with notice speedily enough for the necessities of the public health, a notice left at the house with the tenant shall suffice; if the owner thus notified shall not comply with such notification or order of the local board of health within the time therein specified, said board shall proceed to remove said nuisance, source of foulness, or cause of sickness hazardous to the public health, and all expenses incurred thereby shall be a lien upon the property of the owner of the real estate or building on which the nuisance has occurred, for which he may have action against any person or persons who have caused or allowed said nuisance; and it is also provided that the property owner shall have the right under his notification, of speedy reference to the state or county board of health acting in a body or through its executive officer, within such time as the local board of health shall on his application direct, unless in its judgment the danger to the public health is too immediate to admit of delay; and in case any injunction or stay of proceedings in any form is applied for, such injunction or stay of proceedings shall not be issued until the local board and the state board have been notified to appear and be present at such hearing; but the failure of the owner to cause removal, or the refusal of the court applied to, to grant a stay of proceedings, shall not prevent the party or parties making the application from any suit at law and recovery of damages, if the alleged

nuisance be shown to have been in no way hazardous or prejudicial to the public health.

9. And be it enacted, That in order to secure the preparation of such tabular classification and deductions therefrom as bear upon political economy, population, the causes of disease and of epidemics at the time of indexing the records of marriages, births and deaths, there shall also be made a full transcription of such vital facts as are required for such purposes, and the allowance toward such transcription, and for the indexing of the records, shall be five cents for each return, payable in the same way as heretofore provided for the index record but the amount to be paid to the registrar or others for this clerical service, shall be determined by the state board of health, and the medical superintendent shall render to the secretary of state and to said board yearly an exact statement of the whole amount thus received and how expended, and the balance, if any remaining, shall be paid over to the state board of health and its expenditure accounted for through account audited by the president of said board and approved by the governor.

10. And be it enacted, That at the enrollment of the children each year by the clerks of district schools or by other proper officers in cities, inquiry shall be made as to how many of the children within the school age are unvaccinated, and the same shall be designated by a mark on said roll, and in the case of any found unvaccinated whose parents desire them to be protected from small-pox, but who, in the judgment of the board of education or the trustees of the school district, are not able to pay therefor, the school clerk or other authorized person may give to said child or children a permit to appear at the office of any regularly licensed physician of said school district or of said township to be vaccinated, and any such physician, on the presentation of such permit, with his certificate appended thereto that the said vaccination has been by him successfully performed, shall be entitled to receive from the township committee or city treasurer fifty cents for every such certified case.

11. And be it enacted, That in case of any county having a county board of health or vital statistics, nothing in this bill shall change or modify their former power or jurisdiction and they shall possess all the authority herein granted to city or township boards; and they shall yearly report to the state board

of health as to the cities and townships of the county, in the same way as is required in counties where there is no county board of health; they shall be the sole power to make ordinances in relation to the public health and to carry out the provisions of the laws of this state in reference to the registration and returns of vital statistics, in their respective counties nothing in this act shall relate to or effect any boards of health now organized in any of the cities of this state under the provisions of their respective charters.

12. And be it enacted, That this act shall take effect on the first day of April, one thousand eight hundred and eighty.

Approved March 11th, 1880.

EXPLANATORY CIRCULAR TO CITIES AND TOWNSHIPS.

April 1st, 1880.

The recent Legislature passed some acts which have important bearing upon the care of the public health. We shall quote such parts and sections as require early attention on the part of communities.

I. "An act concerning the protection of the public health, and the record of vital facts and statistics relating thereto."

Sections one and two are as follows:

1. Be it enacted by the Senate and General Assembly of the State of New Jersey, That every city, or borough or incorporated town, or any town governed by a commission, shall have a board of health of not less than five or more than seven members, of which the keeper or recorder of vital statistics, and also one city physician and city health inspector shall be members, if there be such officers; and the said board of health shall be nominated by the mayor and approved by the common council or other governing board of the city, borough or town, to serve for not less than three years, but not more than three of the number shall go out of office at any one time, unless in case of removal by death or change of residence.

2. And be it enacted, That all cities of over ten thousand inhabitant shall have one or more city health inspectors, who

hereafter in any new board, or in any case of vacancy, shall be appointed by the board of health.

These two sections are afterwards limited so as not to compel any city that already has a Board of Health, organized according to a mode prescribed in its charter, to be changed. But it is mandatory as to all others, and also as to those cities which have nominal Boards of Health or Health Committees, whose mode of construction is not specified in their charters. An Inspector is required in all cities of over ten thousand inhabitants. It is also desirable that those cities which, by their charters, have the construction of their Boards of Health defined, should conform to the general method and spirit of this law as far as their charters permit.

Sections three and four are as follows:

3. And be it enacted, That in each township of the state outside the city limits, the township committee, together with the assessor and the township physician, if there be such an officer, shall constitute the board of health for all such townships outside of any city limits, and shall have the same powers as are possessed by any city board of health within the state, so far as the same could relate to any unincorporated district.

4 And be it enacted, That every local Board of health of any city, borough, town or township shall, on or about the first of October of each year, in addition to any other reports that the local authorities may require, prepare an annual report of the condition of the public health in their district, stating, also, any special causes of deterioration of health or hazard thereto, and shall therein answer any inquiries which have been addressed to them by the state board of health; in the case of cities the same shall be presented to the city authorities, and the board of health shall, on or before October fifteenth of each year, forward a copy of the same to the address of the State Board of Health at Trenton; and in the case of townships, a similar report signed by the chairman of the township committee, shall, by the same date, be sent as herein provided for city boards.

Under this law the township committee, the assessor, and the township physician, if there be one, are directed soon after April first, to organize as a Board of Health. They will then please notify this Board of the Post Office address of each member. In the meantime we shall send a Township Health Book to each

assessor for the use of such Township Board. Cities should have a similar Health Book. The general duties of the Board are to guard against preventable causes of disease, and to seek to prevent the spread of disease. The Town Health Book should be kept by one of the members. Generally either the assessor or township physician have most correspondence with the State Board and the Bureau of Vital Statistics.

On the first page of the Health Book give name of township, its number of square miles, its population by the census of 1880, white and colored, male and female, number under twenty-one, and number between school ages if possible. Repeat each year as far as necessary.

Any prevalent sickness, such as periodic or malarial fevers, whooping cough, etc., should be noted, even if few or no deaths have occurred therefrom. Also any prevalent diseases among animals and their fatality.

The condition of school-houses or other public buildings should be noted.

Where there are villages in the township, special note should be made of any insanitary conditions.

Any cases of complaints of nuisances or evils injurious to health should be recorded, together with the action of the Health Board thereupon.

A copy of the report made each year to the State Board of Health should be transcribed. As the State Record of Marriages, Births and Deaths extends from July first of each year, the yearly entry thereof should begin with that date. For convenience of comparison, some prefer to divide it into two periods of six months each.

The report sent yearly to the State Board of Health should also relate to the period from July to July, with an appended note at the close as to anything very special in the three months just preceding the report.

Food or fruit production may be briefly noted, as bearing on health condition. All such brief data are very valuable for after study as well as for present knowledge.

The following is a schedule of some of the subjects as to which reference and report are needed:

SCHEDULE.

A. Location, population and climate.
B. Geology, topography and contour.
C. Water-supply.
D. Drainage and sewerage.
E. Streets and public grounds.
F. Houses and their tenancy.
G. Modes of lighting.
H. Refuse and excreta, (how managed.)
I. Markets.
J. Diseases of animals.
K. Slaughter-houses and abattoirs.
L. Manufactories and trades.
M. Schools and school and other public buildings.
N. Alms-house, hospitals and other charities.
O. Police and prisons.
P. Fire guards.
Q. Cemeteries and burial.
R. Public health laws and regulations.
S. Registration and vital statistics.
T. Quarantine or care over contagious diseases.
U. Sanitary expenses.
V. Heat and ventilation for dwellings.
W. Diseases of the year.

It is well to keep a yearly record of tempera ture and rain and snow fall, such as this:

Table of Temperature and Rainfall at———, from January 1, 18—, *to December* 31, 18—, *by———.*

MONTHS.	Minimum Temperature.		Maximum Temperature.		Mean temperature of month.	Fair on days.	Snow on days.	Rain on days.	Total rain and melted snow. (Inches.)	Monthly mean of rain and melted snow in previous five years.
	Date.	Degree.	Date.	Degree.						
January	8	9.50	22	48.25	31.00	18	5	11	6.445	3.813
February	4	8.00	28	55.75	33.24	16	2	6	4.960	3.292
March	28	17.25	10	67.00	45.16	18	3	13	3.035	4.958
April	6	40.00	21	78.50	55.55	15	0	8	1.730	4.823
May	14	39.00	26	85.00	60.73	21	0	9	4.205	2.432
June	6	48.75	30	93.25	68.20	18	0	8	2.446	2.677
July	23	61.50	3	98.25	78.25	18	0	11	4.330	5.172
August	26	55.00	9	90.50	73.09	17	0	10	8.060	6.189
September	28	43.75	1-2	88.00	67.47	17	0	10	2.535	4.701
October	29	35.00	2	76.75	56.41	23	0	8	2.823	3.628
November	15	27.00	12	58.00	42.65	18	2	9	4.570	4.569
December	25	13.50	1	57.75	31.83	20	6	7	7.459	2.265
Means and Totals	Feb. 4.	8.00	July 3.	98.25	53.63	219	18	110	54.363	.....
Previous five years	Jan. 4, 1873.	12.00	July 26, 1877	90.00	50.48	227	30	97	48.499	.....

Thermometers in the shade, having a northern exposure, protected from reflection.

Thus the coldest and hottest days, and the mean temperature for the year and for a series of years is easily referred to.

The Board should meet in April and the last of September, and as much oftener as needed on the call of the chairman.

The first report to the State Board of Health, in October, should give items as to most of the schedule subjects, and a full idea of present conditions. Afterwards, from year to year, each subject may be presented in its due proportion of importance. Either the township physician or some other medical man will prepare or aid in the outline.

Section five is as follows:

5. And be it enacted, That boards of health of cities or townships or any county health board shall, through the keeper or recorder of vital statistics, take cognizance of any neglect of returns on the part of any persons charged with this duty under the laws of this State, and are authorized to pass ordinances additional thereto, and not conflicting with the same; and they shall have the same powers of action for neglect as is given to the state board of health, and in addition, in the case of the failure of any city clerk, assessor or physician to make full returns as required by law, may bring action for the same and recover for the use of said city or township to the amount not exceeding fifty dollars; and in case of the death or removal of any assessor before the time for electing a successor, the township clerk shall take charge of and report such returns until the election of an assessor.

Localities should not only secure general returns of vital statistics, but, from year to year, study deaths and the causes of deaths in certain localities, and obtain information as to healthy and unhealthy situations. When the figures are entered side by side for five years or more, they often guide in identifying local evils.

The Health Board must now see to it that ministers, physicians, etc., do not neglect a duty which is a part of their service. The law passed this year exempting physicians from jury duty more than compensates for the time and trouble.

Section six is as follows:

6. And be it enacted, That the state board of health, in making inquiries and investigations in regard to the causes of disease and mortality and the modes of their limitation, may aid any local board to the amount of twenty dollars in any one year, and that for this purpose, and also for extending its own inquiries

into the sources of physical deterioration or local causes of disease, the board be authorized to expend two thousand dollars each year, in addition to the amount heretofore provided, said expenditure to be accounted for each year by itemized bills, audited by the president and secretary of the board of health and approved by the governor, and then shall be paid as other accounts of said board.

This section appropriates two thousand dollars, part of which we may use in organizing these Boards. With this fact and the number of townships in view, we shall be able this year to pay to each Board such sum under ten dollars as is actually expended by them. The bill of expenditure must be certified by the assessor and the chairman of the township committee. It is believed that in each township the Board of Health thus constituted may meet at the time of the transaction of other business, and will need to expend but little, except where special cases recognized by the town committee, or complaints, may require attention. In such cases the public benefits far outweigh slight expense. The State Board of Health, as a body, has only its actual expenses paid, and these local Boards can do much on the same basis, with such special provision for any special service. The time has come when population must be cared for as a great material resource and as a part of our prosperity. Small villages and country districts often have their local nuisances or cases of spreading contagions, and there is need of some authority to which to appeal. It is as unprofitable as it is afflictive to have localities suffer from diseases or nuisances which are within the range and duty of local control. The Board hopes that careful attention will be given to concise yearly records in the Town Health Book, and will expect every three or five years by an examination of all these records, as well as from the annual reports transmitted, to secure valuable facts as to the care of health, the prevention of diseases and pauperism, and the promotion of public welfare.

Sections seven and eight are as follows:

7. And be it enacted, That the board of health of any city, borough, incorporated town or township, shall examine into all nuisances, foul or noxious odors, gases or vapors, or causes of ill health or disease that may be known to them or certified to them by three or more freeholders or tenants, as in their opinion

injurious to the health of the inhabitants within their township, or in any such vessel within any harbor or port of such city, borough, town or township, and shall deal with the same as in the manner herewith directed, to wit: whenever such nuisance or source of noxious odors, or cause of ill health or disease, shall be found on public property, or on the highway, the person or persons officially in charge thereof as overseers, civil officers, directors or trustees, shall be notified to cause the same to be removed as the case may require; and if failing so to do the procedure shall be the same as hereinafter provided in the case of private individuals.

8. And be it enacted, That whenever such nuisance, source of foulness or cause of sickness hazardous to the public health, shall be found on private property, that the board of health of the city, town or township in whose limits it may be, shall at once notify the owner at his own expense to remove the same within such time as said board shall deem the public health to require, a duplicate copy of the notification being also left with one or more of the tenants or occupants; if the owner resides out of the state and cannot be reached with notice speedily enough for the necessities of the public health, a notice left at the house with the tenant shall suffice; if the owner thus notified shall not comply with such notification or order of the local board of health within the time therein specified, said board shall proceed to remove said nuisance, source of foulness, or cause of sickness hazardous to the public health, and all expenses incurred thereby, shall be a lien upon the property of the owner of the real estate or building on which the nuisance has occurred, for which he may have action against any person or persons who have caused or allowed said nuisance; and it is also provided, that the property owner shall have the right under his notification, of speedy reference to the state or county board of health, acting in a body or through its executive officer, within such time as the local board of health shall on his application direct, unless in its judgment the danger to the public health is too immediate to admit of delay; and in case any injunction or stay of proceedings in any form is applied for, such injunction or stay of proceedings shall not be issued until the local board and the state board have been notified to appear and be present at such hearing; but the failure of the owner to cause removal,

or the refusal of the court applied to to grant a stay of proceedings, shall not prevent the party or parties making the application from any suit at law and recovery of damages, if the alleged nuisance be shown to have been in no way hazardous or prejudicial to the public health.

These sections are in accord with the highest legal advice as to methods, and can be carried out when the public safety demands. Some one member of the Township Board of Health may be recognized as its chief executive officer, to act for the Board by their authority. Those seeking the removal of nuisances will often aid in preventing unnecessary expense.

Section ten is as follows:

10. And be it enacted, That at the enrollment of the children each year by the clerk of district schools or by other proper officers in cities, inquiry shall be made as to how many of the children within the school age are unvaccinated, and the same shall be designated by a mark on said roll, and in the case of any found unvaccinated whose parents desire them to be protected from small-pox, but who, in the judgment of the board of education or the trustees of the school district, are not able to pay therefor, the school clerk or other authorized person may give to said child or children a permit to appear at the office of any regularly licensed physician of said school district, or of said township, to be vaccinated, and any such physician, on the presentation of such permit, with his certificate appended thereto that the said vaccination has been by him successfully performed, shall be entitled to receive from the township committee fifty cents for every such certified case.

This section extends to the poor the privilege of vaccination, and thus relieves them from an exposure which might not be culpable on their part. Incorporated cities are only exempted from these provisions if they have municipal charters which have similar and generally far more mandatory powers. These will also make yearly reports to the State Board of Health. Thus, being in possession of vital statistics, and of brief health reports from every part of the State, we shall be able to make such a summary as will exhibit the actual health condition of our population. Thus we may know how to deal with, and abate evils whether general or special, and to compare each part with the other. The general health condition of each township *and city needs this* supervision.

Besides these general health provisions, Hudson county and some of our cities have secured larger powers for abating localized evils. Authority to deal with epidemics as found among animals has been given to this Board. A law has also been passed, which, while not intended to endorse the medical diplomas of the many poor medical schools, will help to restrict the malpractice of those who are dealing with serious diseases, without the least evidence of any acquired skill and competency.

This Board now, more fully than ever before, invites the co-operation of every municipal and township Health Board. Believing in the local execution of sanitary laws by local authorities, it only insists upon such uniformity as is necessary for co-operative State interest, and such as has received the sanction of the best medico-legal sanitarians. The highest results of social life and health care can only be secured by a central bureau to collect, collate and advise, and by such strict and co-ordinate administration in each city and district as both general and local interests demand. The organization is now imperative, but ordinances and their execution depend on localities. We ask the mayors and city clerks of cities, and the assessor or township physician of each township, to at once call together the persons designated in this act, and communicate the names to us.

Each Health Board should carefully preserve the yearly reports of the New Jersey State Board of Health, which will be sent to the assessors and city clerks for this purpose. The three already published can be had of the assessors. The Third Report is especially needed, as containing the circulars thus far issued, and former laws that have been passed. So soon as three or four are obtained they should be bound, so as not to be mislaid.

All inquiries or communications should be addressed, State Board of Health, Trenton, N. J.

By order of the Board.

EZRA M. HUNT,

Sec. of State Board of Health and Med. Sup't of State Vital Statistics.

Note.—This circular was placed in each Township Book furnished. Any modifications in the law will be reported from time to time. It is requested that Boards of Health, in addition to securing accurate returns of vital statistics, shall in their *annual* reports, state the prevalence of any disease during the *year*—the number of cases as accurately as possible.

CIRCULAR TO LOCAL BOARDS OF HEALTH.

TRENTON, September 15th, 1880.

GENTLEMEN:—A report from your Board of Health to October 1st, will be expected to be sent to the office of the Board, State House, Trenton, if possible, by October 15th, and not later than November 1st.

Important facts and statements will be embodied in the State report, and the whole will be kept on file for future reference as to the conditions of public health in all localities of the State.

We have already become aware of important work done by many of these boards. Others, because of locality or tardiness in organization, or because members have failed in comprehending the work to be done, have merely organized.

The few that have failed to organize must immediately do so, and report to us the names and address of the members.

The period since the law went into operation is so brief, that this year we only seek correspondingly brief reports on such of the topics referred to on the printed page of the book that was sent, as may have come under the consideration of the Board. In cities and the more populous districts, it is well to follow the order of the book schedule, A, B, C, etc., in the order there presented.

The report of the State Board, for this year, will contain suggestions as to the work of local boards.

All inquiries should be addressed State Board of Health, Trenton, N. J.

ANNUAL REPORT

Of the Local Board of Health of (city or township).....
county of.....for the year ending October 1st, 188

NAMES AND POST OFFICE ADDRESS OF MEMBERS.

.....

.....

SCHEDULE OF SUBJECTS FOR REPORT.

A. Location, population and climate.
B. Geology, topography and contour.
C. Water-supply.
D. Drainage and sewerage.
E. Streets and public grounds.
F. Houses and their tenancy.
G. Modes of lighting.
H. Refuse and excreta, (how managed.)
I. Markets.
J. Diseases of animals.
K. Slaughter-houses and abattoirs.
L. Manufactories and trades.
M. Schools and school and other public buildings.
N. Alms-house hospitals, and other charities.
O. Police and prisons.
P. Fire guards.
Q. Cemeteries and burial.
R. Public health laws and regulations.
S. Registration and vital statistics.
T. Quarantine or care over *contagious* diseases and vaccination.
U. Sanitary expenses.
V. Heat and ventilation for dwellings.

Other subjects may be named under W, X, Y, Z. The subjects may thus be referred to by the letters.

If the sheet provided is not sufficient, add others, marked with the letters which designate the topic treated.

Under W, give all facts as to diseases which have occurred the past year.

A.

B.

"AN ACT TO REGULATE THE PRACTICE OF MEDICINE AND SURGERY."

TRENTON, June 1, 1880.

Copy of a law passed by the Legislature of 1880, entitled "An act to regulate the practice of Medicine and Surgery."

1. BE IT ENACTED *by the Senate and General Assembly of the State of New Jersey*, That every person practicing medicine or surgery in this state in any of their branches for gain, or who shall receive or accept for his or her services any fee or reward either directly or indirectly, shall be a graduate of some legally chartered medical college or university in good standing, or some medical society having power by law to grant diplomas; and such person before entering upon said practice shall deposit a copy of his or her diploma with the clerk of the county in which he or she may sojourn or reside, and shall pay said clerk ten cents for filing the same in his office; said copy to be a *matter* of record, and open to public inspection.

2. And be it enacted, That any person who shall practice med-

icine or surgery, without conforming to the requirements of the first section of this act, shall be deemed guilty of a misdemeanor, and on conviction, shall be punished by a fine of twenty-five dollars for each prescription made or operation performed, said fine to be sued for and recovered in an action of debt, by any person who will sue for the same, and in default of payment of said fine, the offender shall be imprisoned in the county jail for a period of not less then three, nor more than six months; *provided always*, that he or she may be liberated at any time by paying the amount of said fine and costs.

3. And be it enacted, That it shall be unlawful for any person not qualified according to the first section of this act, to collect any fees for medical or surgical services.

4. And be it enacted, That any person who shall offer for record a copy of any diploma which shall have been issued to any other person, or a diploma issued or obtained fraudulently, shall be deemed guilty of a high misdemeanor, and on conviction thereof, shall be punished by a fine of not less than three hundred dollars, nor more than five hundred dollars, or imprisonment at hard labor for not less than one nor more than three years, or both at the discretion of the court.

5. And be it enacted, That nothing in this act shall be so construed as to prevent any physician or surgeon in good standing, and legally qualified to practice medicine or surgery in the state in which he or she resides, from practicing in this state, but all persons opening any office, or appointing any place where he or she may meet patients, or receive calls, shall be deemed a sojourner in this state, and shall conform to the first section of this act.

6. And be it enacted, That this act shall take effect on the first day of June, one thousand eight hundred and eighty.

This law did not emanate from the State Board of Health, but its bearing on the public health is such that we send a copy to local boards and to physicians. It has been sought by the people and by practitioners of the different schools who concur in the view that no one should be allowed to announce himself or herself as a doctor of medicine, who can not show some evidence of such kind of instruction as is indispensable in the attempt to treat human diseases. While this does not assert the competency

of all having diplomas, since some of our medical colleges are not strict enough, it makes a good approach to protection and gives the best legal assurance now available. Under such a provision three thousand unauthorized practitioners in the State of Illinois have ceased to impose upon the public.

Every local board of health and every general or local medical society in the State should now see to it, that in such township and city the diploma or medical license of any person who claims to be a doctor in medicine and surgery is put on record. [The diploma is not required to be translated.] Unless local authorities attend to this the law might be neglected. If they do, it will soon appear who are authorized practitioners in this State. It will also assist to ascertain from whence come the purchased diplomas which are sometimes found in the hands of authorized practitioners.

Those who already have their diplomas or medical license on record in the county in which they reside, need only to look it up and re-enter it, as on file.

If any person claims to have lost his diploma or certificate of license, the law makes no provision therefor, but if such person will send a statement of the fact, and of the institution and date of graduation to the county clerk, it will, we believe, serve as protection from penalty for breach of the law, until the letter can be fulfilled, or provision made for such special cases. County clerks need to see the original diploma, and compare it with, the copy offered, and enter that fact on the back of the copy or else take the affidavit of the person offering it.

CONTAGIOUS DISEASES OF ANIMALS.

A supplement to an act entitled "An act to establish a state board of health," approved March ninth, one thousand eight hundred and seventy-seven.

1. Be it enacted by the Senate and General Assembly of the State of New Jersey, That in addition to the powers conferred by the act to which this is a supplement, said board shall have full power and authority to examine and determine whether pleuro-*pneumonia*, rinderpest, or any other contagious or infectious dis-*ease* exist among animals in any county in this state; and that

the sum of five hundred dollars is hereby appropriated to defray the actual necessary expenses of said board while making such examinations.

2. And be it enacted, That in the event of any contagious or infectious disease as aforesaid, breaking out or being suspected to exist in any locality in this state, it shall be the duty of all persons owning or having any interest whatever in said cattle, immediately to notify the said board of health, or any one of them, of the existence of such disease, and thereupon it shall be the duty of said board of health, or any member thereof, to immediately proceed to the place or places where said disease is reported to exist, and to quarantine said animal or animals, and take such precautionary measures as shall be deemed necessary; to prescribe such remedies as in their judgment will be conducive to the recovery of such animal or animals, and to enforce such regulations as may be adopted by said board of health.

3. And be it enacted, That the board of health aforesaid, and all such assistants as they may appoint, whenever in their judgment or discretion it shall appear in any case that the disease is not likely to yield to any remedial treatment, or whenever it shall seem that the cost or worth of any such remedial treatment shall be greater than the value of any animal or animals so afflicted, or whenever in any case such disease shall threaten its spread to other animals, to cause the same to be immediately slaughtered, and their remains to be buried not less than four feet under ground, and all places in which said animals shall have been kept to be cleansed and disinfected.

4. And be it enacted, That in all cases where animals afflicted with, or which shall have been exposed, shall have been slaughtered or killed by the order of the said board of health, or their assistants, it shall be the duty of said board to appoint three competent and disinterested freeholders to appraise the value of the animals so killed or slaughtered, at the time they were so killed; who shall be affirmed, or sworn before proceeding to act, to make a just and true valuation of said animals so killed, at the time of their slaughter, two-thirds of which valuation or appraisement shall be paid to the owner or owners by the state.

5. And be it enacted, That any person or persons refusing or neglecting to notify said board of health, or any of them, of the existence of pleuro-pneumonia, rinderpest, or any other contag-

ious or infectious disease among cattle, shall be deemed and adjudged guilty of a misdemeanor, and upon conviction shall be punished by a fine of not more than two hundred dollars, or by imprisonment not exceeding one year, or both, at the discretion of the court.

6. And be it enacted, That all bills for money expended under this act shall be audited by the comptroller of this state and then submitted to the governor for his approval and after being thus audited and approved by the governor, shall be paid by the state treasurer upon warrant of the comptroller.

7. And be it enacted, That said board shall keep a full record of their proceedings and shall publish the same in the annual report of the state board of agriculture, yearly, and every year during the existence of this law.

8. And be it enacted, That if any person or persons shall knowingly either buy or sell or cause to be bought or sold any animal or animals affected with pleuro-pneumonia, rinderpest or any other contagious or infectious disease, all such person or persons shall be deemed and adjudged guilty of a misdemeanor, and upon conviction thereof, shall be punished by a fine not exceeding two hundred dollars or imprisonment not exceeding one year, or both, at the discretion of the court.

9. And be it enacted, That in case an emergency shall arise and a larger sum shall be deemed necessary, than the amount appropriated by the preceding sections of this act, said state board of health shall present the facts in evidence to the president of the state agricultural society, and the president and executive committee of the state board of agriculture, who shall authorize such additional expenditure as in their judgment they may deem the exigency of the occasion to demand; provided that in no case shall the amount of money thus authorized to be expended exceed the sum of five thousand dollars in any one year.

10. And be it enacted, That all acts and parts of acts inconsistent with this act be and the same are hereby repealed, and that this act take effect immediately.

Approved March 12, 1880.

TO FARMERS AND DEALERS IN STOCK.

CIRCULAR A.

The act of 1877, constituting a State Board of Health, made it the duty of this Board "to make inquiries and reports in reference to diseases affecting animals and the methods of prevention." An act of the present Legislature gives additional power in reference to pleuro-pneumonia or other contagious diseases affecting animals. The State Board of Health directs this circular to be distributed.

The legislation of this State as to the diseases of animals, only has reference to preventing the spread of infectious or contagious diseases. When animals are seriously sick from any cause, the owner should make his own arrangements for *skillful treatment.* But when any infectious or contagious disease so far prevails as to threaten to become epidemic, the results which may accrue to citizens at large are so serious, that all governments recognize the right to investigate for the prevention or limitation, and to enact such restrictions as those skilled in the management of epidemics may advise. This State has now placed this oversight within the jurisdiction of the State Board of Health, and thus imitates the custom of other countries.

PLEURO-PNEUMONIA.

The chief infectious malady which has been considered as existing in this State is *Pleuro-Pneumonia.* It may be called lung-plague, but not cattle-plague, since the latter is the name for the very different disease, Rinderpest. That the disease is one which inclines to spread, is agreed by all authorities. Its very threatening justifies the expenditure of such an amount of money as may be necessary to determine its character and its extent. When discovered much depends on the severity of the type or the disposition it has shown to become epidemic.

It is not generally claimed that it ever occurs any more than small-pox, except as it is transported from some previous case. This Board will at first seek to determine where infectious pleuro-pneumonia now exists. With a rigid regard to the trouble of quarantine, it will only exercise the power when the rights of

the people require it. Such action, however annoying to the owner, is in his real interest. We propose not to give orders rashly; to enforce them when given.

Our trade, food supply and stock interests will be greatly aided when, as we trust will soon be the case, we can free each owner from any suspicion of the disease among his cattle.

General Le Duc, the Commissioner of Agriculture, responds at once to our request for an active co-operation with us in stamping out this disease where it exists, and in settling, by expert aid, the question of its extent. In this, too, we are to have the counsel and support of the Executive Committee of the Board of Agriculture. A rapid sanitary inspection will at once be instituted at all places where it has recently prevailed. It is the duty of any owner having cause to suspect such a disease to send us notice.

The attack usually begins with coldness, and dry, hacking cough, with symptoms of pain and uneasiness. The animal refuses food. Milch cows diminish in milk. Even an unskilled man knocking with the fingers against the opposite sides, back of the shoulders, will detect the difference in sound of the two sides.

Both the fever and heat are marked. Many of the symptoms correspond with pleurisy or pneumonia in man—with the same varied severity, and with either acute or chronic symptoms. If new cattle have come into the herd, or if the disease is prevalent near by, there is more ground for suspicion.

The owner must exercise close watch and honestly seek to know whether there is ground to suspect infection. In disputed cases the only way is to consent to submit it to skilled examination and inquiry, and not to make a positive diagnosis in matters in which the owner cannot expect himself to be fully competent.

On March 15th the Secretary of this Board made a visit to a farm on the Delaware, opposite the New Jersey border, in order to examine into the symptoms of the disease, and to compare it with other lung diseases in man or animals. The account of the farmer was that three months previous he bought a cow which, a few days after, sickened and died. He has since lost twelve. His own account, and that of adjoining farmers, would, we think, satisfy most that the disease is infectious pleuro-pneumonia. The United States Veterinary Surgeon, the State Inspec-

tor of Pennsylvania, and other recognized authorities were present, by appointment. Physical examination of four animals showed each with one lung consolidated; three had been sick less than one week and one four weeks. Post-mortem examinations fully verified the diagnosis. The lungs were found increased from about two and a half to twenty pounds, with such changes as are now being microscopically examined. A cow had died of the same disease three days before at Camden. There can be no doubt that it exists more or less in this State, and still more in Pennsylvania and Maryland, from which its ingress must be guarded.

It is strongly in the interest of the farmers and stock dealers of this State in every way to meet the facts and aid us in a speedy riddance of the malady. We propose to act in concert with them for the public welfare. There can be but one conclusion after due examination had—where the disease is found to exist, we must either isolate or quarantine, or give notice to others of the place where it exists, or notify the owner that he will be held accountable if any animal of others becomes infected by exposure to his herd. Where the veterinarians find the disease it is better to kill the animal.

The fact of pleuro-pneumonia in an animal does not decide that it is unfit for food use. This is determined chiefly by the severity of the sickness.

All farms or herds in the State which have been adjudged to have had infectious pleuro-pneumonia should, as a preventive, keep the cattle this spring and summer in temporary sheds, so that the others can be thoroughly cleansed of all moveable material and be well whitewashed. It is best to add four ounces of dry chloride of lime to a gallon of the whitewash. In any case the cattle will be benefited by this removal from the yards, and the farmer's interest be promoted by the removal of all suspicion of the disease. . It is a short-sighted policy for any one for a little present saving to subject his cattle to continued suspicion, or to an actual and prolonged existence of the malady.

As it is believed that the chief contagion comes from the lungs it is best to sponge the mouth and nostrils of all well and exposed animals, twice each day, with a solution of chloride of zinc. The fifty per cent. solution (Squibb's) costs twenty-five cents per pound, and, diluted one-fourth, a tablespoonful of it

suffices each time. Or it can be purchased solid in ounce bottles for eight cents, and dissolved in a half gallon of hot water. A little tar rubbed in the mouth and nostrils also cleanses. Those about sick animals should wash their hands in the zinc solution. For various other disinfectants, see Third Report (or the last July circular) of the State Board of Health.

Every farmer who purchases new stock should, for a month, keep it apart from his herd while any infection is prevalent. No cattle should be allowed to pasture on commons, as this disease thus spreads in summer. Read the law and the penalties you may incur by spreading the contagion. It is to be remembered, that animals, in order to preserve health, need to be kept naturally; that they need right food, pure air, good water and exercise in order to be healthy. If well fed, and yet having neither rubbing nor exercise, the result must be to breed disease. It is profitable to change stabled cattle from their stalls from time to time. Some diseases are made malignant or contagious by closeness and filth. It is for the interest of all owners to adopt those precautions which, by the most successful dealers, are regarded advantageous. Milk is a great absorbent of contagion. It is very important that it should not be kept standing in or near the yards, but the cans to receive it should be outside the pens and yards, and removed as soon as the milking is over.

As the present law extends to the care of all infectious diseases of animals, and has not single reference to any one disease or any single year, we shall hope to aid and to be aided by all those who rightly estimate the great pecuniary profit and personal comfort of prevalent good health among the lower animals. Cows kept after the packed-herring system, or tied all winter in a stall, will not maintain good health, and will stand ready for any epizootic disease.

PNEUMO-ENTERITIS.—(HOG CHOLERA.)

There is evidence that this disease prevails considerably in some parts of the State. The loss to this country last year was about twenty millions of dollars from this disease.

It is actively contagious. The name cholera deceives as to it, for it is a fever in which not only the intestines, but the lungs *and gl*andular system are usually affected.

It commences with loss of appetite and constipation; the skin becomes reddened and often pimpled. Cough and hurried respiration, as well as diarrhœa, are among the symptoms. About seventy per cent. of the pigs die in two weeks, while those surviving are of little value. The time of catching is generally from five to fifteen days. The only method of dealing with it is the same as with pleuro-pneumonia, viz: the killing of all sure cases, isolation of the sick, and an entire removal to another pen of all well ones.

The Board will be glad to receive information as to any prevalent disease of animals, and will give to the subject such attention as it may demand.

Whenever any contagious or infectious disease has caused the death of any animal, or is believed to exist in any neighborhood, any person may properly state the fact to us.

Copies of the law can be had on application.

Letters or postals should be addressed,

State Board of Health, Trenton, N. J.

TO TOWNSHIP AND CITY BOARDS OF HEALTH IN REFERENCE TO INFECTIOUS DISEASES OF ANIMALS.

CIRCULAR B.

TRENTON, April 10th, 1880.

Both public health and financial interest require local attention to contagious diseases among animals.

Infectious pleuro-pneumonia and other diseases of cattle greatly concern milk and food supply.

Pneumo-enteritis, or hog cholera, and other diseases of swine affect human health.

Glanders, a disease of horses, is directly communicable and very fatal to individuals.

Just now there is need to guard our State against infectious pleuro-pneumonia and to rid us of suspicion of its prevalence, which is far beyond the actual facts. It is a disease which, where it exists, should not be concealed and should be isolated, and no

communication with suspected herds should be allowed until all risk is at an end.

It is to the interest of every city and township now to see to it that the disease is prevented in their respective districts. City stables are oftener centres of contagion than are the herds of farmers.

The formation, under a recent law, of boards of health in each township and city of the State, and the new powers of the County Board of Health in Hudson county, enable us to have local oversight of these and other diseases throughout the entire State.

Both city and township boards of health are enjoined carefully to guard against all contagious diseases.

Let all local boards of health inquire also into such diseases of animals as seem to be contagious and notify the Board of the same. We have full power to examine and determine whether any contagious or infectious diseases exist among animals in this State. It is a work incidental to your oversight of the general health.

The late act as to diseases of animals does not restrict this power of local boards or that of township committees under former laws.

The township board of health should enjoin the assessor in his visit to find out the existence of any such disease. In cities local inspectors may do the same. No city is alive to its own interests as to milk and food supply and as to health conditions that does not learn where and how animals are kept within its limits.

When any local animal disease is reported to us, and authenticated as possibly infectious, we shall at once make inquiry, and, if really necessary, at the expense of the State, send an inspector. If the disease is found we shall certify the same to the owner or person having interest therein. We shall not quarantine but by his consent, but if not, shall give notice to him and others that the disease exists in his herd, and warn him that the law requires that he should notify the Board, and also of the penalties of purchase or sale as contained in sections five and eight of the act of March 12, 1880. If by delay in separating or killing infected animals, or by exposing others to the

contagion, other animals are affected, the owners thereof, as well as this Board, will have action in law against him.

In case of the slaughter of animals under our direction, they will be paid for at two-thirds their full actual value.

There is now so little of the disease in the State that it is all the more practicable to secure its complete eradication.

We have had the 110 herds which were in quarantine at date of March 10th, under the former authority, examined, and find not over two that are now centres of contagion and one other that has shown the disease since March 10th. We shall secure the complete isolation of these animals and the herds to which they belong. We shall seek the modification of New York restriction as not now needed toward our whole State.

While by consultation with the authorities of Pennsylvania, and with farmers and stock-raisers in our own State, we are satisfied that methods of ferry inspection are not feasible or successful, we have arranged a system of notification and oversight which will be no less efficient than the former plan in preventing the ingress of the disease from other States. A milk inspector, employed by the State, will aid in inquiry as to the contagious diseases of animals. While local boards must feel charged with the duty of looking after their own districts, we shall thus be able in various ways to aid local efforts, as well as to seek information through individual sources and by our own special methods.

All communications should be addressed

State Board of Health, Trenton, N. J.

CONTAGIOUS DISEASES OF ANIMALS.

CIRCULAR C.

TRENTON, August, 1880.

The State Board of Health has had oversight of the contagious diseases of animals since March 12th, 1880. Although cases of glanders and of pneumo-enteritis (hog cholera) have occurred, our chief attention has been called to the contagious diseases of neat cattle. Most of the herds in quarantine previous to March 12th, were *so far recovered* as not to need longer detention. We

have not been able to trace subsequent cases that have occurred in the State to these herds. Outbreaks which have occurred in some of the counties are now, we believe, under control.

In a township in Union county, where pleuro-pneumonia has long been troublesome, the township Board of Health has efficiently aided us. The most recent and troublesome cases are in Burlington county, where it has recently appeared in five herds, in which several cattle have been slaughtered. It is also under supervision in two other counties. We believe it is to be decided within the next year whether the pest shall be localized in our State. If any one doubts its devastating nature, its communicability or the calamity of its presence, we only ask that they will send to us for the names of farmers in our State who have recently suffered from it, and confer with them. The slaughter of all fresh cases and the separation of the exposed herds from all others is imperative. In every case we have had thus far, the disease is, we think, traceable to purchased cattle. Cows sold from infected herds or store calves, which have been taken from infected cows, often convey the disease.

No farmer or stock raiser should now make additions to his herd, unless he can trace the animal purchased and receive a warranty that there has been no exposure. Where cattle are bought it is well to keep them at least six weeks from mingling with the general herd.

Where the disease has manifested itself, we recommend the erection of temporary sheds until November and a thorough disinfection of all stables and sheds. Chloride of zinc is advised to be used for the sponging of the nostrils *both of the sick and well cattle*, where the disease has appeared.

An ounce bottle of the solid chloride, costing ten cents, can be dissolved in a half gallon of hot water, and from a half gill to a gill in all be given in the drinking water at different times each day. Common tar smeared in the nostrils is of service.

It is best to heap all manure outside of the buildings and to sprinkle hay or straw, which has been used, with some disinfecting solution, and remove it and whitewash the buildings.

Sulphate of iron (green vitriol or copperas) costs two cents per pound, and a pound to a gallon of water answers well for sprinkling over surfaces that have been exposed.

"Calx powder," made by powdering one bushel of dry char-

coal and two of stone lime and mixing them, is also a good corrective.

Sirel's compound consists of—

Sulphate of iron (green vitriol or copperas), 40 lbs.

Sulphate of lime (gypsum or plaster of Paris), 50 lbs.

Sulphate of zinc (white vitriol), 7 lbs.

Bone charcoal (ivory black), 2 lbs. (Or 6 lbs. of dry wood charcoal.)

This may be sprinkled dry over places exposed to moisture.

What is known as the "lime and salt mixture" is not only valuable agriculturally, as an addition to compost, but has valuable disinfecting and deodorent properties. It is prepared by adding one bushel of salt to three bushels of fresh slaked lime. Stir it frequently until the mixture becomes moist, and then add to it twice the amount of loose dry earth. This may be scattered freely over the ground where the cattle have been kept or have pastured.

During heavy winds or storms, all doors and windows of sheds should be fully opened, so that stalls and all parts may be flushed with air. There is much need of attention to the airing of stalls when the cattle are out of them.

There is reason to believe that many farms where pleuropneumonia has once occurred have had new outbreaks months after, in removing straw or hay, or by, in some way, stirring up infective particles which had been concealed. There is great encouragement to seek its prevention, since the disease is believed never to occur in this country, except as it is caught from some previous case or from exposure to the immediate grounds or buildings where the disease has before existed.

Farmers and dealers need to be watchful, and whenever any of their cattle seem ailing they should at once be separated from the rest. If they have good reasons to suspect it to be pleuropneumonia, or if the local veterinarian so pronounces it, there must be no delay in notification as required by the law.

Local boards of health and township committees may often be consulted with advantage. Where the disease prevails they are especially charged with the duty of preventing its spread.

They are the appointed guardians of the welfare of their respective towns and townships, and for mutual protection should aid in preventing the spread of so serious a disease.

Cattle must not run at large in townships in which it prevails. The milk from ailing cows should not be sold, although there is no record of the disease from this source. Yet common judgment teaches us that animals that are feverish and sick cannot furnish good milk. Cattle that recover from pleuro-pneumonia are generally left with one lung diseased, and they should be fatted. The disease thus far overcome does not effect the meat. As some believe that an animal once having had the disease may retain an infecting power or have an outbreak from the diseased lung, it is better to fatten any animal that has been known to have had pleuro-pneumonia and to have partially recovered.

If only for a year or two all will be diligent in preventing the outbreak and conveyance of this great pest, we shall get rid of it in this State.

Any inquiry may be directed

State Board of Health, Trenton, N. J.

AN ACT TO REGULATE THE SALE OF MILK.

A supplement to "An act to regulate the sale of milk," approved April fifth, one thousand eight hundred and seventy-eight.

1. Be it enacted by the Senate and General Assembly of the State of New Jersey, That the third section of the act to which this is a supplement, which section reads as follows:

"3. And be it enacted, That all penalties imposed under the provisions of this act, may be sued for in any county of this state where the offence is committed, in any court having competent jurisdiction, one half of the fine to go to the person making the complaint, and the other half to be paid to the county collector for the benefit of the county," be amended to read as follows:

3. And be it enacted, That all penalties imposed by the provisions of this act, may be sued for in any county of this state where the offence is committed, in any court having competent jurisdiction; that the state board of health are hereby empowered and directed to appoint each year a competent person who shall act as inspector of milk, at a salary not exceeding six hundred dollars per annum, payable on the order of the president and

secretary of the state board of health, approved by the governor, in quarterly payments for the purposes of this act, and who shall act until removed by said board or until his successor is appointed; said inspector, having reason to believe the provisions of this act are being violated, shall have power to open any can, vessel or package containing milk and not stamped or marked as directed by the first section of the act to which this is a supplement, whether sealed or otherwise, or whether in transit or otherwise; and if upon inspection he shall find such can, vessel or package to contain any milk which has been adulterated or from which the cream or any part thereof has been removed, said inspector is empowered to pour the contents of such can, vessel or package upon the ground, and bring suit against the person or party so violating the law, and the penalty when so collected by such suit shall be paid into the treasury of this state; that when suit is brought under this act by any person other than such inspector, the penalty, when collected, shall one half go to the complainant and the other half to the county collector for the benefit of the county.

2. And be it enacted, That this act shall take effect immediately.

Approved March 12, 1880.

NOTE.—A more stringent act has just passed.

AS TO MILK SUPPLY.

CIRCULAR A.

TRENTON, April 26, 1880.

The evils arising from the adulteration of milk are so serious that many of the larger cities, and many of the states, have found it necessary to enact laws or ordinances in reference thereto.

Not only is there an unfair and injurious competition when adulterated or inferior milk is sold, but great injury is done to the public health. Children are often compelled to rely upon purchased milk, and there is abundant evidence that much sickness and many deaths result from the impurity or bad quality of this food.

The unfairness of such traffic and the evil to consumers is such *that the Legislature of this* State, at its last session, directed the

State Board of Health to appoint a Milk Inspector. Applicants were subjected to a careful chemical examination as to their knowledge and general fitness for such an appointment. William K. Newton, M. D., was selected to fill the position. He will, with the aid and direction of this Board, seek to correct unfair dealing and to detect attempted frauds.

Milk may be defined as pure when it comes from a healthy cow, and when nothing is taken from or added to it.

The adulterations most common are as follows:

The dilution of milk by water.

The sale of skimmed milk as natural milk.

The separation of the strippings from the rest of the milk.

The removal of small quantities of cream, technically known as "topping."

The sale of milk from cows too soon after calving.

The sale of milk purposely impoverished by modes of feeding or keeping.

The addition of soda or other alkalies.

The use of materials to thicken or whiten the milk.

The addition of coloring or other matters to cover up some fraud.

The following is a synopsis of New Jersey State laws, bearing on the subject of our milk supply:

Act of April 7th, 1875. The sale or keeping of adulterated milk is a misdemeanor, punishable by a fine of $50, and imprisonment for thirty days. To adulterate milk, or to keep cows for the production of marketable milk in an unhealthy condition, or to sell milk as pure milk from which the cream has been taken is also punishable as above. The addition of *water or any substance* is defined as an adulteration. Milk from cows fed on distillery waste (commonly called "swill") is declared impure, and contrary to this act.

Act of March 23d, 1865. To sell or bring to a cheese or butter factory adulterated or "skimmed" milk, or to keep back any "strippings," is punishable by a fine of $15.

Act of April 5th, 1878. Every person who shall sell, or who shall offer or expose for sale, any milk from which the cream, or any part thereof, has been removed, shall distinctly and durably stamp or mark, in letters not less than two inches in length, in a conspicuous place, above the centre, upon the outside of every

can, vessel, or package containing such milk, the words "skimmed milk," and such milk shall only be sold or shipped in or retailed out of a can or other vessel so marked.

Violations of this act are punishable by a fine of $50. The sale or exposure for sale of milk contrary to this act is presumptive evidence. The non-payment of the fine is punishable by imprisonment.

Act of March 12th, 1880,—supplementary to the above act. The State Milk Inspector is appointed and empowered to open any can, vessel or package containing milk, whether sealed or otherwise, or whether in transit or otherwise; and if upon inspection he shall find such can to contain milk which has been adulterated, or from which the cream, or any part thereof, has been removed, the inspector is empowered to pour the contents of the can upon the ground, and bring suit against the person violating the law. (See new law of 1881.)

Any citizen may act as complainant under these acts.

We ask the assistance and co-operation of all local boards of health, local inspectors, city and county physicians, and people interested in the supply of pure milk.

The State Inspector will visit in turn the various parts of the State, unknown to dealers, in order to check the sale of adulterated and impure milk. He will be provided with all the approved instruments for testing milk, and will, when necessary, make analyses to determine adulteration, etc.

It will be his aim to prevent dishonest dealing, so far as it affects the common interest of the milk trade and the health of our citizens. He is also to investigate evils to the milk supply that may arise from improper feeding, improper housing, or from existing diseases among milch cows.

Action at law will be had when required, or his services be available in evidence.

Communications may be addressed to William K. Newton, M. D., Paterson, or to the State Board of Health, Trenton, N. J., which intends to fully sustain the efforts of the Inspector in preventing a fraud so detrimental to the public health.

CIRCULAR TO LOCAL BOARDS OF HEALTH

And to those whose duty it is to make returns of Marriages, Births and Deaths.

The Index for the statistical year just ended, indicates an increase in the returns of marriages and births for the State, and a decrease of over one thousand in the returns of deaths. We have reason to believe that all returns have been more faithfully made than in any previous year, and the diminution in death certificates has been owing to a decrease of the rate of mortality.

By a comparison of our returns from different city clerks and assessors, we are more and more seeing how much of the perfection of the record depends upon careful attention and supervision of these officers. Carelessness or want of judgment on their part soon begets carelessness or neglect in those who by law are required to make the returns to them. Local boards of health are now so organized under the law that their influence can be brought to aid, where there is negligence, or they or the assessors can send direct notice to any who overlook their duty. It is enough here to say that accurate vital returns, by all States and countries are recognized as the "account of stock," without which a State or district cannot know its health condition, or provide therefor, any better than a merchant can reckon, without knowing the material on hand and the influences that are reducing its value or destroying it. Already in comparison of returns we are able to trace and compare localities of disease, which means abatement thereof, under the use of proper methods. Many of our cities are needing to study streets and blocks as related to disease. Townships may learn much by finding out through series of years what parts are most affected. Where ministers are dilatory as to marriage certificates, where physicians neglect to make returns of births, or where undertakers neglect to secure the burial certificates until after burial, and continue to neglect after being cautioned, it is the duty of the assessor and of the Local Board of Health to report the fact to the Bureau of Vital Statistics, which is under the Department of the Secretary of State. If any person hereafter fails to find the record of his or her marriage, or if the birth of a child, or if the death of a relative is *not filed* in this office, it may involve losses and embarrassment

for which the party neglecting is culpable under the law. Recently most important recourse has been had to these records, in testing the claims of life insurance, in legal proof of property rights, and in comparisons for the coming National Census; at the same time there is increasing evidence that physicians are appreciating these returns, as a part of their professional relation to their patients, and a duty the same as that which has so long been acquiesced in by those who have official charge at marriages, and by undertakers. The licensed medical profession is receiving recognition which is more than a pecuniary pittance, and more of the people are appreciating the great interests of public health thus promoted. We, therefore, ask as the part of all officers a vigilant and systematic attention to the reception and transmittal of the returns.

Blanks may always be had of the city clerks and assessors, or by application through postals directed to this office. A paper-bound book of blanks will be sent to such as require fifty returns of either kind each year. Physicians who may fail to receive the Annual Report will please notify us, and any clergyman may have it on application.

By order of the Bureau of Vital Statistics.

CIRCULAR AS TO SMALL-POX.

TRENTON, February, 1881.

The State Board of Health has evidence of the existence of *small-pox* in scattered localities in this State, as well in the cities of New York and Philadelphia. The epidemic, as existing in Camden long since, upon the invitation of the local authorities, received our attention, and vigorous measures were instituted by them. But now, from other sources, scattered cases have occurred in other towns and in rural districts, until it may easily become a wide-spread epidemic. Four or five cases, occurring in Trenton, have already disbanded the Normal School.

The right of school trustees to require vaccination in order to secure attendance at school in times of epidemic, or else to prohibit attendance is not questioned. By the terms of the health laws of *March 11th, 1880, all* school boards are authorized to vacci-

nate, at public expense, any pupils attending school who are unable to procure vaccination.

All local health boards need to see to it that vaccination is recommended, as well as rapid isolation of cases secured, if any occur. The cost of local epidemics of small-pox is very great, besides the risks to life and public health. The prevention of the disease is within the range and duty of your control. All our local health boards and school boards should co-operate in influence and provision for more general vaccination, and for re-vaccination of persons who have not been vaccinated since full growth. The heads of large manufacturing establishments need to attend to it, both in the interest of capital and labor. Trenton has set a good example in making the means therefore accessible.

Most of our physicians have full confidence in humanized vaccine virus, which is easily secured. *Vaccine virus directly from the animal* is preferred by those who have any fear of communication of other diseases through humanized lympth—a fear that is greatly magnified in the popular mind. It is, nevertheless, due that all have their preference, and that where vaccination is insisted upon as a condition of school attendance, bovine virus be used if desired. Many physicians prefer to use this. The New York City Board of Health, 301 Mott street, New York, furnishes it daily by mail. H. A. Martin & Son send it direct from their herd, Roxbury Station, Boston, Mass. Dr. E. L. Griffin, Fond du Lac, Wis., is prompt in remittal from his vaccine farm. Ready supplies can also be had from Philadelphia and other cities. The price per point is about twenty cents, and less in larger quantities. It can often be had from local druggists. There is reason to believe that much is sold for bovine virus which is not such, and that there is a failure in effect because of age and imperfect keeping.

We urge upon all physicians great exactness in selecting virus, and upon the people protection from the disease. Its outbreak every few years is not a proof of epidemic tendency. The periodicity rather occurs because that, after an epidemic, as soon as years enough have passed for a younger product of children to be out in public child-life, this susceptible material becomes so abundant as to insure extension if a single case is introduced from another section. Then there is an outbreak of

small-pox and of vaccination. Would it not be better if, somehow, the young population could be systematically protected? Let our various communities and the local boards now secure this, not only under present threatenings, but also as a wise preventive measure.

Copies of this circular will be sent more fully on application by postal to State Board of Health, Trenton, and any inquiries be promply answered.

IMPORTANT LAWS BEARING ON PUBLIC HEALTH,

PASSED BY THE LEGISLATURE WHICH ADJOURNED MARCH 25, 1881.

I. An act relating to Local Boards of Health.

1. Be it enacted by the Senate and General Assembly of the State of New Jersey, That all township or local boards of health in this state, organized under the provisions of an act passed March eleventh, one thousand eight hundred and eighty, entitled "An act concerning the protection of the public health, and the record of vital facts and statistics relating thereto," may expend, for the purposes for which said boards are authorized, to the amount of fifty dollars as actual expenditure, not including any payment to members for attendance at the meetings of said boards, and the same shall be payable in the same manner as other bills presented to the collector, treasurer or other disbursing officer of the township, town or precinct; and in case any additional sum is, in the judgment of such board, needed to be expended in any township, town or precinct, the need thereof shall be presented to the township committee, common council or other governing board, and they shall have authority to appropriate such an amount, or pay such bills, as they may deem necessary for the purposes indicated in the act aforesaid.

2. And be it enacted, That any boards of health now organized in any of the cities of this state, under the provisions of their respective charters, as well as those which are only health committees, may, by the order and direction of the mayor and common council of said cities, organize their boards in accord with the provisions of the act aforesaid, and shall, in common with the boards of health of the several townships, towns or boroughs

of this state, have power to make and enforce such ordinances as the care of the public health demands.

Approved March 22, 1881.

II. An act entitled "An act to provide for drainage where the same is necessary to the public health."

This act gives well defined powers, and with judicious application can do very much to rid the State of malarial localities.

III. An act to prevent the adulteration of milk and to regulate the sale of milk.

Its terms are definite. The Milk Inspector must be a public analyst, to make "analyses, investigations of foods, drugs and other substances, as he may be directed so to do by the State Board of Health."

IV. Supplement to an act to regulate the practice of medicine and surgery. Approved March 22, 1881.

It adds the words "professional service," and increases the power of the law.

V. An act to authorize cities to construct sewers and drains and to provide for the payment of the cost thereof. Approved March 22, 1881.

VI. A supplement to " An act for incorporation of companies for draining and improving meadows and lands overflowed by tide-water.

VII. An act to prevent the adulteration of food or drugs.

VIII. A further supplement to an act entitled " An act to establish a State Board of Health," etc.

This act relates to the " Contagious Diseases of Animals," and gives to the State Board full power and control as to them, recognizing also the co-operation of local boards.

Other acts do not reach us in time for report.

SPECIMEN SCHEDULE OF SANITARY INQUIRY, (INSTITUTIONAL) BY THE NEW JERSEY STATE BOARD OF HEALTH.

Name and post-office address of institution.

Name and post-office address of physician.

Name and post-office address of chief officer.

Location.

Are buildings owned by township or county?

Area of ground and altitude above sea level.

Character of soil.

How are grounds improved?

General character of buildings and material of construction,

Date of erection and cost.

Average yearly cost of repairs.

Is there an accurate geological map and description?

Are there contour maps, topographical maps, and a plan and schedule of all underground apparatus or appliance?

Have natural water-courses been disturbed?

Is there any damming up of water for ponds?

Give place, size, depth, character and locality of any springs and wells.

Are they opened or closed, and what is the mode of getting water therefrom?

Is there any artificial drainage?

Size of rooms for bed or sitting rooms on first floor.

Size of rooms for bed or ward rooms on second floor.

Size of rooms for bed or ward rooms on third floor.

What is the finish of walls?

Are the rooms wainscotted?

How near to *ceilings* are windows?

Are there windows, shutters or blinds?

How is admission of sunlight regulated?

Is there shade?

Does sunlight enter all the rooms?

Have you had any accident?

Are all children vaccinated?

Have all adults been vaccinated within ten years?

What facilities have you, besides ordinary house cleaning, for cleansing and varnishing of furniture and bedsteads, mattresses, &c.?

Do you have wood or iron bedsteads?

Is there any system by which new suits of outside clothing are furnished to inmates and by which clothing long worn is cleansed by airing or heating?

What are the facilities for bathing and washing for inmates?

How is laundry work conducted?

Are the inmates fed in their rooms, or when able, do they come to a common table?

What is the arrangement for drainage?

What is the size, shape, thickness, construction and preparation of pipes? How joined?

Is there a basement or cellar? Is there an unoccupied attic?

How are these ventilated?

How much below ground level, and how occupied?

Does water ever stand in it?

Are walls and floors concrete?

Are sewers connected with drains?

How?

Give the exact fall per foot, and any variations.

How are sewers ventilated?

Are there grease traps?

What is the indoor water-closet arrangement?

Are water-closets in projections, or separated by corridors?

If there are any sewers or pipes leading from the house, give their size and construction and fall and outlet.

Give modes of ventilation, kinds of traps and just where located.

What is the out-door arrangement?

How often is the material removed, and by what method?

Do fecal and slop material mingle?

If separate, are urine and waste water separate?

How is slop-water disposed of?

What is the system of flushing or disinfection?

If to a cesspool, describe it and where it empties, and how it is cleansed and how often?

Is there open ventilation between the cesspool or sewer and the house?

If so give full plan.

What is the water supply?

Is it brought on all the floors, and how?

How is the water stored?

Is there an overflow pipe? If so how trapped and joined to what outlet?

If in cisterns, how often cleaned?

What their locality?

Is provision made for the "washings" of the roof to be carried off first?

Of what material is the roof?

If no cisterns, how is the roof water disposed of?

If water is got from wells, what are the chances for contamination with sewage or surface drainage?

Is there any reason to suspect impure water?

What is the system of ventilation?

Give full plan.

Have there been anemometer or other tests?

Is there any provision for changing the air of rooms during cold weather?

Have the heating and ventilating appliances been tested in varying conditions of atmosphere?

What is the method of heating?

Give plan.

How many wards or bedrooms have fire places?

What was the average number in the house last year?

What was the expense for maintenance last year?

What is the plan of outdoor relief?

What was the cost last year.

Have you a regular dietary each day?

If so, give the dietary each day.

Have you any insane paupers?

How many are demented or foolish?

How many are harmless?

Are they, or should they, be separately kept?

What are the arrangements for separation of males and females?

What are the nursing arrangements?

What is the medical attendance?

How is it arranged for?

How much is paid therefor?

How are medicines furnished?

Are any disinfectants kept on hand?

If so, how used?

Inform us what changes are needed in all present arrangements.

Physicians will state any facts of interest regarding sickness during past year, or sanitary defects existing.

What was the number of deaths, and their causes, last year?

Have you any system of employment for inmates?

What is the discipline and oversight of attendants?

Is any special industry followed?

If so, give particulars.

Is it profitable, or merely for occupation?

How many inmates have tobacco furnished them?

How many have opium furnished them?

What was the tobacco bill last year?

What was the liquor bill?

What was the quinine bill?

What are the arrangements for schooling children?

Are any apprenticed out, and at what age?

Are places sought for any not yet apprenticed?

What visitation have you that looks into the moral and physical welfare of the inmates? What provision therefor?

What provisions are there for amusements or for reading matter for inmates?

How many of the inmates were born in dependency?

What provision in case of fire?

What is the method of lighting?

Is any register kept of inmates as to habits, cause of dependence, mental condition, &c.?

What is the cubic space per inmate?

What are the hospital arrangements?

Is there any oversight of or inquiry into the physical condition of inmates?

SPECIALLY FOR JAILS.

Have any been detained as witnesses in cells during the past year, and how long?

What system have you for receiving excretions of the body during the night?

What in cases of sickness?

What are the chances for sunlight to enter cells and corridors?

Are prisoners allowed to smoke and make ablutions in the cells?

Cubic space of each cell.

What chance for change of air in cells?

If prisoners are suddenly taken ill in the night, how may they summon assistance?

Size of windows in cells.

Size of doors.

Amount of sickness and number of deaths yearly.

REPORT

OF THE

BUREAU OF VITAL STATISTICS.

DEPARTMENT OF STATE.

TO HON. HENRY C. KELSEY, SECRETARY OF STATE.

BY EZRA M. HUNT, M. D.,

Medical Superentendent of State Vital Statistics.

THE CENSUS,

AS BEARING UPON QUESTIONS OF POPULATION.

The great design of vital statistics is to furnish an estimate of some of the most important conditions of population, and to aid in those objects for which an enumeration of inhabitants is instituted. Statistical inquiry has now come to be such a science and such a practical art of political economy, that the mere record of numbers is only one of the incidental purposes of statistics. Yet this must be accurately had in order to estimate the relative conditions and the ebb and flow of population.

The census of 1880 has been taken with more regard to extended studies of social, and race, and economical conditions than any that has preceded it. The large number of schedules furnished shows the range of inquiry. It still remains to be shown how the facts and figures obtained are to be most successfully applied to the study of the various branches of social study. Still more importance attaches to the census from the fact that the general government has also made provision to aid in the semi-decennial census, and thus prepared the way for a closer study of the people.

An effort was made to obtain returns in this regard from each State. While the plan showed the broad and just conceptions of the superintendent and his advisers, it also demonstrated that for vital returns its chief reliance must be upon statistics obtained near the time of the occurrence of the events. So the State bureaus will need to secure the most of this kind of information.

In the study of population in the States, an early question to be decided is, what shall constitute the sanitary unit of inquiry. Shall the vital conditions and the health of the people be compared by counties, or by townships, or by cities, towns, villages and rural districts. Shall there be comparisons with reference

to the geological basis, since, as in our State for instance, definite lines in this respect can be drawn? Or shall areas be taken with reference to special water-sheds, with comparisons of highland and lowland, mountains and of valleys with extended river relations. Or shall the comparison be made between dwellings upon the sea-shore districts, and those amid hill and mountain ranges. Or shall climate come into consideration, in a State so diversified as ours? These, and such like questions, naturally suggest themselves. Each in their turn, and when enough facts are gathered, will be worthy of thought and comparison.

But with present facts and present methods of obtaining a census, our first natural enumeration for comparison is by townships. In each township the area is sufficiently narrow to present the people as subjected to much of the same general kind of local influences. A variation, however, needs to be made in reference to the larger cities and towns. The smaller villages differ but little from the rural parts of the townships.

But so soon as population is aggregated in cities, it has its own consequent complications or changed conditions. So the larger cities need also to be compared among themselves. City Boards will need to compare parts of the same city with each other by wards or districts. Our State law provides that the vital facts as to cities of over 5,000 inhabitants shall be tabulated separately in order to facilitate comparisons. We, for the present, shall here give only two comparative tables, viz: one presenting the Census of 1880 n order to show actual present population and relative growth, and second, the same as to all cities now of over 5,000 inhabitants.

We also add as an item for information without distinct classification, the size of other towns and boroughs of this State so far as they can be separated from the township precincts with which they are enumerated, so as to aid in local comparisons, although there is great variety of incorporation, so much so that a commission not long since reported it impossible to enumerate the towns of the State. Yet the approximate statement is valuable for reference and to aid in future adjustments as to local boards of health. In a few cases comparisons of smaller localities cannot be accurately made without remembering that new townships have been formed on the area changed; where this is the case *the fact* must be borne in mind.

We give the census record in order to facilitate comparisons and for future study of the vital conditions and variations of the population. There may be some small corrections to be made in the last census, but these can be noted hereafter.

Entire population of the State			1870	907,144
"	"	"	1875	1,019,413
"	"	"	1880	1,130,892

The present total of 1,130,892 presents for the State a population 75,698 less than the total of New York City.

It is made up as follows:

Males	559,803
Females	571,089
Native	909,309
Foreign	221,583
White	1,091,856
Colored	38,796
Chinese	176
Japanese	2
Indians	58
East Indians	2
Albinos	2

These figures, as those following, are still subject to possible corrections from the census office.

LIST OF CITIES, TOWNS, VILLAGES, ETC., OF THE STATE, SO FAR AS THESE CAN BE GIVEN, WITH THEIR POPULATIONS.

NOTE.—Some towns have not been enumerated or reported in the census distinctly from the townships in which they are included. We give the list of every precinct, which differs in any wise from a township method of oversight, and the forms of its government so far as possible. There is great need in this State of some general law as to these organizations, and such uniformity as will admit of comparative study. As far as possible the mode of government will be indicated and the population, as distinct from the township, given so as to aid in future vital statistics. Where the town population is not given distinct from the township, the population will be marked *Twp.* The populations will be given as far as possible as by the census of 1880.

ATLANTIC COUNTY.

Absecon, town, in Egg Harbor township	507
Atlantic City, city	5,477
Egg Harbor City, city, in Galloway township	1,232
Hammonton, town	1,776 Twp.

BERGEN COUNTY.

Hackensack, in New Barbadoes, township	4,250 Twp.

BURLINGTON COUNTY.

Beverly, city, in Beverly township	1,759
Bordentown, city, in Bordentown township	5,334 Twp.
Burlington, city, in Burlington township	7,237 Twp.
Pemberton, borough, in Pemberton township	799
Mount Holly	4,630 Twp.
Fieldsborough	

CAMDEN COUNTY.

Camden, city	41,658
Gloucester, city	5,347
Haddonfield, borough, in Haddon township	1,480
Merchantville, borough, in Stockton township	3,093

CAPE MAY COUNTY.

Cape May, city	1,699
Cape May Point, borough, in Lower township	198

CUMBERLAND COUNTY.

Bridgeton, city	8,729
Millville, city	7,660
Vineland, in Landis township	6,005 Twp.

ESSEX COUNTY.

Belleville	3,004 Twp.
Bloomfield	5,748 Twp.
East Orange, city	8,349 Twp.
Irvington, village, Clinton township	2,742 Twp.
Montclair	5,146 Twp.
Newark, city	136,400
Orange, city	13,206

ıth Orange, village	3,911	Twp.
nton, town	2,742	

GLOUCESTER COUNTY.

ıodbury, city, in Deptford township	2,298	

HUDSON COUNTY.

yonne, city	9,372	
ttenburgh, town	1,206	
rrison, city	5,510	
boken, city	30,999	
sey City, city	120,728	
ion, town	5,849	

HUNTERDON COUNTY.

ıton, borough	842	
ıchtown, borough	1,039	
nbertville, city	4,183	

MERCER COUNTY.

ımbersburg, borough	5,437	
ghtstown, borough, West Windsor township	1,396	Twp.
nceton, borough	4,348	Twp.
ınton, city	29,910	

MIDDLESEX COUNTY.

v Brunswick, city	17,167	
th Amboy, city	4,808	

MONMOUTH COUNTY.

›ury Park, borough, Neptune township	4,187	Twp.
ehold, town	4,302	
an Grove, Neptune township	4,187	
l Bank, Shrewsbury township	5,059	Twp.
ıg Branch, Ocean township	6,027	Twp.
yport, Raritan township	3,891	Twp.
tawan	2,699	

MORRIS COUNTY.

ınton	2,685	Twp.
·er, Randolph township	7,701	Twp.
ristown, town	6,838	Twp.

OCEAN COUNTY.

Only Townships.

PASSAIC COUNTY.

Passaic, city	6,532
Paterson, city	50,887

SALEM COUNTY.

Salem, city	5,057

SOMERSET COUNTY.

Somerville, town, Bridgewater township	7,997 Twp.

SUSSEX COUNTY.

Newton, town	2,513

UNION COUNTY.

Elizabeth, city	28,229
Rahway, "	6,454
Plainfield, "	8,126

WARREN COUNTY.

Belvidere, town	1,773
Hackettstown, town	2,502
Phillipsburg, city	7,180
Washington, borough	2,142

According to this we find that of the 1,130,892 of the inhabitants of New Jersey about 690,000 live in cities, or some form of incorporated towns. When our vital statistics reach over a greater number of years, there will be still more opportunity to study the effects of locality and of different density of population upon life and health—as also upon local prosperity.

From these we at present select out and associate cities and towns according to their population.

OVER ONE HUNDRED THOUSAND.

Newark, Essex county	136,400
Jersey City, Hudson county	120,728

Note.—Hoboken is so much a part of Jersey City that its close

proximity must be borne in mind in all vital study. The same is partly true of some of the suburbs of Newark.

BETWEEN SEVENTY-FIVE AND ONE HUNDRED THOUSAND.

No city.

BETWEEN FIFTY AND SEVENTY-FIVE THOUSAND.

Paterson, Passaic county..... 50,887

BETWEEN TWENTY-FIVE AND FIFTY THOUSAND.

Camden, Camden county..... 41,658
Hoboken, Hudson county..... 30,999
Trenton, Mercer county..... 29,910
Elizabeth, city, Union county..... 28,229

In reference to Trenton, it is also to be remembered that Chambersburg joins it closely with 5,437 inhabitants.

FROM FIFTEEN TO TWENTY-FIVE THOUSAND.

New Brunswick, Middlesex county..... 17,167

FROM TEN TO FIFTEEN THOUSAND.

Orange, Essex county..... 13,206

FROM FIVE TO TEN THOUSAND.

Bayonne..... 9,372
Bridgeton..... 8,729
Plainfield..... 8,126
(North Plainfield, 3,217 additional.)
Dover..... 7,701 Twp.
Millville, Cumberland county..... 7,660
Phillipsburg..... 7,180
Burlington, township..... 7,237 Twp.
Montclair, township..... 5,146
Union, Hudson county..... 5,849
Harrison, Hudson county..... 5,510
Atlantic City, Atlantic county..... 5,477
Chambersburg, Mercer county..... 5,437
Gloucester City, Camden county..... 5,347
Bordentown, Burlington county..... 5,334 Twp.
Salem, Salem county..... 5,057
Morristown, Morris county..... 6,838 Twp.

Passaic City, Passaic county	6,532
Rahway	6,454

We have placed in this list those cities of over 5,000 in which, although the township population is included, it is so inconsiderable as not to affect the general estimate.

We now name others in which the city population, as distinct from that of the township, is unknown, but in which the township forms a considerable per cent.

Somerville, Somerset county	7,997
Bloomfield, Essex county	5,748
Red Bank, Monmouth county	5,059

CITIES, TOWNS, ETC., BETWEEN TWO AND FIVE THOUSAND.

Mt. Holly, Burlington county	4,630 Twp.
Princeton	4,348 Twp.
Lambertville	4,183
Asbury Park	4,187 Twp.
Boonton, Morris county	2,685 Twp.
Newton, Sussex county	2,513
Hackettstown, Warren county	2,502
Washington, Warren county	2,142

The death rates of these thus admit of comparison, although a period of about five years of observation is necessary, unless the indications of local disease are very apparent. These facts are thus put on record in order to aid the Central Bureau and all Local Boards in their study and tabulation of Vital Statistics.

The census of 1880 will be found for each township in the death rate tables, and need not be repeated here.

YEARLY OUTLINE AND SUMMARY.

In dealing with vital statistics, we need at the start to have ear views as to the intent of the record. One part is purely for gal use; another only for vital study. A third part has a ixed value. The relative proportion to be determined by the earing of the information given.

Thus the name of a deceased person is secured for legal iden- fication; the *cause of death* for its bearing on the vital concerns f community, while the place and time of marriage, birth or eath have value in their relation to questions both of legal and ital import.

While the importance of such a registry has long been recog- ized, and a method of securing it has long been in exercise, its adequacy, its incompleteness, and the absence of any system of ndexing, has made it unsatisfactory both to those who have athered the facts and to those who have had occasion to make earch of the record. The laws of inheritance, the requirements f pension laws, of life insurance, and the official seal so often equired to authenticate dates of marriage, birth or death, have ade it now most essential. Hereafter the Marriage, Birth and)eath Records of the State will be of far greater service in estab- ishing rights of property. It will only be culpable negligence n the part of those who are to make returns that will omit the ecord of any marriage birth, or death occurring in the State. teferences which it formerly sometimes took hours to verify, can ow be made in a few minutes.

It is easy to see that every State should be able to certify those vents which have to do with the rights of the individual. The mportance of these as a portion of the statistics which all govern- nents are now securing, and their vital bearing on the laws of ealth, life and population, adds to the necessity and has fully ustified the *additional* care with which such records are now *ught and tabulated.* Statistics mean the account of how things

stand. This bureau is a central audit of one of the great concerns and resources of the State. It attempts to estimate those vital facts which have so much to do with real prosperity, and to get such information as shall point out how and where our people are suffering from physical disabilities which can be mitigated or avoided.

No sooner had the work of receiving and studying the vital returns been started than it became apparent that the preliminary study must be to prepare a plan of index which should admit of ready reference, for all purposes, whether legal or medical, for which such records are kept. For the first year, under a change in the law, it unavoidably fell to the lot of the medical superintendent to initiate and give direction to this work, and to aid in and provide for the clerical labor needed. A thorough system was adopted, and such full transcription is now made as fully commends itself to the State Board of Health and to all those who have occasion to consult the records.

SECUREMENT OF RETURNS.

The first effort is to secure completeness and accuracy of returns. While we have no reason to complain of any indisposition to fulfill the conditions of the law, any system that looks to the careful collection of vital facts, requires constant vigilance to prevent neglects or oversights. City clerks and assessors, as a rule, have performed their duties with faithfulness and made their returns with commendable promptness. They are sometimes annoyed by delays or neglects on the part of those whose duty it is to send certificates to them. The legal right which the parties have to a record of marriage as well as the requirements of the law, are fully recognized by those who officiate. The former law not only did not pay for a certificate, but practically made it the duty of the person officiating to record the marriage at a county clerk's office, and pay one shilling therefor. This law is much simpler in its process and entails no expense. We only need to urge upon all parties that they see to it that this record is secured and sent promptly to the city clerk or assessor. A neglect may at any time subject to a penalty at law from the parties concerned as well as from the State authorities. A comparison of the returns for the last two years under the former

law as to marriages, and for the first two years under the new law, shows a satisfactory gain as follows:

Year 1877, Marriages	6,022
" 1878, "	5,375
Total	11,397
Year 1879, Marriages	7,096
" 1880, "	7,935
Total	15,031

Although some of the increase may be attributed to a better financial condition, the increase is mostly in record and due to the greater facility of the present law.

The returns of death, we believe, are very complete under the present methods. When the alteration was made for townships, by which the certificate of death, in case of death or burial outside of city limits, would serve as a permit, if returned within five days, it was feared that this might lead to carelessness on the part of undertakers in making their returns. A few cases have been reported to us in which the undertaker has not procured the certificate until after the burial. The law, with its present wording, gives no unnecessary trouble, and undertakers need to know that the intention to procure a certificate very soon is not enough. All sextons and keepers of cemeteries must see either the permit or certificate of death before the burial. For any neglect or delay the full responsibility rests with those in charge of the funeral.

Boards of Health should furnish us with the names of any undertakers who are careless in this regard, or should draw their attention to the remissness.

It is satisfactory to find in a study of the certificates of death, that care is taken in stating the causes of disease. It is unavoidable that in rare cases there is doubt, or that some practitioners betray a tendency to indefiniteness, which is a defect of education or experience, rather than of intent. But no one can handle 20,000 of these certificates without seeing that these sources of error are largely overcome by the general reliability and exactness of return. Where there has been reason to object

to vagueness of return in causes of death, they have been chiefly such as these.

Congestive chill and congestive fever are not good terms, unless under the secondary heading there is some reference to the supposed cause. General debility for a child, over one month of age, or for a person under the age of sixty, is also too vague. Fever alone is too indefinite.

Teething should have added thereto, the prominent symptom, as diarrhœa, convulsions, etc. Marasmus often needs a secondary noting. A return of septicaemia or pyaemia should state the organ involved, if there is a local abscess or other organic lesion.

NOMENCLATURE.

It is a question which must early have the attention of our medical men and of vital statisticians, whether some change is not desirable in the accepted nomenclature of disease. When the English classification was adopted, it was not without careful study and examination by committees which represented the best talent of the nation. While, therefore, no abrupt changes should be made, it is admitted that new diseases, or new types of old diseases, or new knowledge as to diagnosis, should introduce some changes. Our own country adopted this nomenclature because we had none of our own. There are diseases special to our own continent and others, greatly modified by locality, and such as need more careful noting.

An important conference of vital statisticians from many of the States was held in May last at Washington, under the auspices of the National Board of Health. Under its order correspondence is now being had on this subject. It is probable that some changes will be made, or that there will be some adaptation to our changed American conditions. As it is also very desirable to have that uniformity by which the States can be compared with each other, an effort is being made to unify the systems now used and thus make the whole available for the general government.

It is now evident that medical science is gaining aid from numerical methods of study; that sanitary science is largely *guided* by such data, and that both are giving prominence and *success* to medical art. It is now scarcely necessary to show to

the physician that benefits accrue to himself and to his profession as well as to society at large, from a close study and classification of disease.

In reference to the returns of births, it will ever be the case that there are some neglects. Those who are in the habit of carrying a few blank forms in the pocket, and who make the record at the time of attendance, find it little trouble, while those who leave cases to collect, and then have not the data at command, may easy make a burden of what would otherwise be too trivial to mention. Yet it is a pleasure to say that the evidences of co-operation and of increasing interest are manifested both in the increase of returns and in the active efforts of local practitioners. Where there is imperfection of returns we already have enough localities in which there is greater completeness to serve as a standard of comparison. For instance, Paterson shows a birth rate so much larger in proportion than Camden, and is so much more approximately correct, that with it and four or five other cities to guide, it is not difficult to arrive at what the birth rate of the latter should be. Especially as now a quinquennial census and local enrollments are likely to aid us in the correction. These cannot take the place of the record of an event at the time either as a legal or vital fact, but greatly aid in arriving at correctness of conclusion. Also the deaths under one year, added to the living in any one year, enable us still more closely to reckon the birth rate.

The importance of having the birth rate in order to know the significance of the death rate, is apparent from the fact that we must know the age of the material with which death is dealing. A mortality of 30 to 1,000 among adults is quite different in significance from what it is among children.

A very large infant mortality, especially in the summer, is one of the greatest indices of the prevalence of avoidable causes of disease. Mr. Edmunds, in his article in the *Lancet*, has also shown how mortality bears a certain relation to sickness at each age. In the English computation it is found that "for every annual death, two persons are suffering from sickness of a severity that disables laboring men from work." Mr. Neison for friendly societies, which exclude children, computed 2.5 constantly sick to one death under 60. Taking into consideration the number of sick that recover if every death stands for over 600 days of sick-

ness, it is easy to see how avoidable sickness is a heavy tax on all industrial and social interests.

STATISTICAL INQUIRIES OF THE GENERAL GOVERNMENT.

It is encouraging to all State and Local Boards of Health that the General Government is, in connection with the late Census, giving such attention to these vital returns. The regional and mortality maps of the last Census were published with an announcement of their incompleteness, but were of very great value as showing the outreach and feasibility of effort to study the zones and habitats of disease. Gen. Walker, under the direction of Congress, made elaborate arrangements to collect more accurate data for the tenth Census. He has so far recognized the value of the methods and returns of this State, that it is one of the two or three he has called upon to aid in furnishing standards of comparison by which to rate sectional defects. It only needs that the plans now adopted be followed out by us, with such additions as experience may suggest in order, in due time, to secure an amount of reliable statistical data that can be made available in many directions. It is probable that some changes will be agreed upon and therefore we can await these.

USES MADE OF STATISTICS.

The Registrar-General of England says, that such a system has enabled the government to acquire a general knowledge of the state of the population of the kingdom. Studying thus the causes that influence the health of the people, we are able to point out local defects and to guard against the evils which cause unnecessary sickness and untimely death.

Parkes, the leading sanitary author of England, shows that "the attention now paid to public health is in a large degree owing to the collection of the statistics of births and deaths, and the causes of death which have been collected in England for the last thirty-eight years. It may truly be said, indeed, that not only all Europe, but gradually the entire world has been influenced by the work."

Its direct practical bearing becomes at once apparent when, as Dr. Elisha Harris expresses it, we note of "the fact that the *death* rate of living people fluctuates from eleven to forty, fifty,

sixty and eighty per thousand each year in different places, the fluctuations being directly chargeable to the locality, the domestic, the personal and certain avoidable vital conditions of the population which present these variations in excess of a minimum rate of mortality."

It is also to be borne in mind that the discovery by Dr. Snow, of London, as to the relation of water-supply to cholera and those as to the dependency of typhoid fever on fecal contaminations were directly the result of the statistical method of inquiry. The consequence has been, as to the more general diseases, that, "in many cases, those districts which the statistical returns showed to be in the worst conditions have come to be the best," just because the exhibit of figures and facts aroused the local authorities to action.

In our own country, Massachusetts and Michigan, as well as some of our most populous cities, have much profited by these returns. Many of the zymotic diseases have had the line of their incidence traced, although so much remains to be discovered. "It is not too much to say that modern sanitary science owes its existence to the registration of deaths and the localization thereby of insanitary conditions"—Mass. Rep., 1877. Dr. Bowditch, in an analysis of 45,000 cases of consumption, has been able to show a very close connection between soil dampness and the prevalence of that malady. These are but illustrations of series of facts which are being tabulated and arranged by close observers as carefully as are the statistics which aid in the study. Political economy and industrial interests no longer need to be persuaded that such studies are within the range and the duty of statesmen. The Austrian Minister of Commerce has well stated it: "Statistics is no longer to be viewed as a mere theoretical science for the gratification of the learned, since, on the contrary, it subserves the practical ends of political society and lends its service to administration, as well in determining the lines of existing institutions and laws, as in weighing measures not yet carried out."

In the early collection of statistics for any State where there are no previous records as to vital facts which can be satisfactorily used, the first point is to collect as far as possible all facts which, in the judgment of statisticians, are likely to be useful in future inquiries. From many of these it would be futile to

attempt to make deductions until enough had been gathered through series of years and in different localities for legitimate comparisons. It is important on the one hand not to multiply items, and on the other not to omit such as are likely to be of service. There is much therefore to be transcribed which does not become immediately available. Yet that especially which relates to disease and death has easy and important lessons.

As comparisons need to be made with the tables of other cities, states and countries, some uniformity of method is to be sought. It was for this that at the late Statistical Conference a committee was appointed to review all forms and adjust them so as to make them comparable.

One of the effects of a central bureau should be to stimulate our larger cities to a close local study of their vital returns. It would require but little additional appropriation to that now required by State law, and would enable them to know the ward and street localities of disease, in such a way as to be of great practical service. The weekly rate of mortality is too often a mere item of news. But if the city board of health is studying it, and inquiring as to causes, experience fully shows that the result is the controlling of epidemics and the abatement of disease. Such large cities as Newark, Paterson, Trenton, Camden, etc., should certainly add to their health force, a method by which the weekly and ward returns can be studied, with the view of localizing the sources of disease, and so remedying existing evils.

METEOROLOGY.

The records of meteorology are imparted in the study of disease. For this, and other reasons, the State Board of Health endeavors to secure weather records at a few stations, which it is hoped may yet be studied in their bearings upon the health and diseases of the people. For the last two years our closest observers have seen much reason to connect prevalent epidemics with climatic conditions. The intensity of yellow fever seemed to have much to do with the notable atmospheric and telluric conditions of 1878–9. The great mildness of the last winter, followed by the almost summer heat of April and May, and the great drought which even interfered with corn-planting, seems to have had considerable relation to the prevalence of fevers,

especially of a periodic type. While we cannot vacate climate or control the seasons, such facts warn us that it is not safe to keep in store the materials for fermentive and putrefactive decay, either animal or vegetable. We should interrupt the results by seeing to that part which falls under our jurisdiction. Or if we have neglected so as to have the accumulations in such seasons, our only relief is to betake us to the mountains or the sea. Unfortunately, large portions of our population cannot do this, and are therefore interested in having healthy homes for all the year.

METHODS OF STUDYING STATISTICS.

While the English and Continental methods of dealing with statistics are valuable as guides, it is evident there needs some modification, when we come to deal with our changed populations. The tides of emigration and the migrations from State to State need to be taken into consideration.

Occupations, which in the technic methods of foreign trades give reliable data, are so often changed by our people that conclusions therefrom need to be studied in classes, rather than from general returns alone. The record of occupation at marriage is more reliable than to take the given occupation in the death certificate, since it is more likely to give the trade or chosen calling.

In the study of the effect of occupations on disease, we believe it will be found more practicable to follow out the history of named employes in specified industries for long periods, than to rely wholly on the death record.

In the study of nationality we have not only to do with the effects of heredity and race, but with the results always incident to emigration, both in the exposures of change and in the risks of acclimatization. Emigrants, for instance, fare badly who arrive in summer and fall and at once resort to crowded cities or to marshy districts. Even changes from one climate of our own country to another are not so desirable at such seasons.

In the study of the causes of pauperism, crime or dependency it would be valuable to know how many children are left in partial or complete orphanage under twelve. Some of these points have to be omitted lest the certificates become too prolix. Suggestions occasionally come to us as to additions to record, which

show an interest in the subject. The index is now in such a form as to be available to local health officers and statisticians who may need to study local questions.

STILL-BIRTH RETURNS.

The record of still-births, for obvious reasons, can never be entirely complete. But the value of the record, and the benefit to society, of the attempt to obtain the record, is already apparent. It is well known that many children perish not by evil intent, but by want of skilled attendance at the time of birth. Sometimes the mother, too, falls a victim, and living children are made orphans.

While we cannot advocate too stringent legislation, it is well when there is some restraint on carelessness, unskillfulness and neglect. We are already made aware by physicians that their aid is sooner sought in perilous cases, and that the general effect of the law is salutary. The highest interests of the people require that the sacredness of child-life should be felt, and that all criminal interference or all neglect at time of birth should be prevented, both by public sentiment and by proper enactment. As attempts at concealment rarely succeed, a record is but the authentication of orderly attendance. The neglect of it is the only ground of suspicion, except in the instances where the frequency of the misfortune in the hands of midwives gives rise to the fear that so-called experience, without educated skill is now and then a peril both to mother and child.

RELATIONS OF LOCAL BOARDS OF HEALTH TO VITAL STATISTICS.

Section five of the law of March 11, 1880, concerning the protection of the public health, directs local boards of health to take cognizance of any neglect to make vital returns on the part of those upon whom this duty devolves. When there is such neglect, the city clerk or assessor may at his discretion see the person or address the bureau of vital statistics, or make complaint to the local board of health. The local board may then insist upon the returns being made, or bring action for the neglect. While cases may occur in which either the local or the State authorities may need to appeal to the law, we do not believe there *is* any deliberate intent to neglect on the part of the negligent

Yet it is very important that full returns be secured. The local boards should therefore not fail, both by the weight of their influence, and by special committee, if need be, to secure this object. The importance of these returns in the study of local health conditions, and of the state of the population through series of years, has certainly not been over-estimated, and has been fully tested in many nations. These local boards should therefore insist upon the legal right which every one has to this record, as also upon the need of it for local health-information. A case has recently come to our notice in which the parents of a child had serious ground of complaint because the medical attendant had omitted the record. With our foreign population, especially, it may at any time cause such embarassment, as to cause both parents and attendant equally to regret the oversight.

The whole number of deaths reported from July 1, 1879, to July 1, 1880, is 18,967, against 20,440 for the previous year, being a record of deaths of 1,473 less than for the year ending July 1, 1874.

A general comparison shows that while there has been some diminution in the class generally known as zymotic, it has not been quite in proportion to the aggregate decrease. We shall briefly notice those diseases which appear in the special schedule.

REMITTENT FEVER.

This has a record of 293 against 268 cases of last year. The death record of this fever is generally accurate, with the exception that there is some doubt as to the placing of fevers returned as typho-malarial. These are usually placed with typhoid fevers, since it is the predominence of this element that usually leads to this nomenclature. It is well, however, in comparison, to pay some attention to the comparative record of typhoid fever. The greater prevalence of malarial disease commenced in the summer of 1878 and was intensified in 1879 and still worse in the summer and fall of 1880. In 1860 and 1861 the State Medical Society made a careful inquiry into the division of miasmatic diseases, now generally called malarial. They were found, at that time, not to be generally prevalent in the State. The years 1855 to 1858 had shown a large prevalence of this class of fevers. Since then no record of the disease has been so extended as for the past two years.

One cannot study the mortality record, and especially by the light of the reports of local boards of health, without perceiving that this period has been characterized to an unusual degree by these periodic fevers. The increased number of remittent and typho-malarial fevers proving fatal, stands for a large number of cases in such a class of disease. Other evidence also shows itself in certificates or reports, even where the record of death does not reveal the great disturbing element; while in such periods the influence of malaria is more extended, yet its points of concentrated powers are not less readily distinguishable. The borders of sluggish, impeded streams, where there is much waste material accumulated, stagnant or artificial lakes and ponds and marshy districts are the breeding places and the haunts of this prolific poison. The finding of a mosquito, or a swarm of them, on the mountain top does not deceive us as to its habitat. As little doubt is there as to the homes and resorts of what has so long been called paludal or marsh fever. Until we shall have secured some general law for drainage, and guard against the collection of great deposits of vegetable matter where moisture, heat and varying exposure ferment and putrefy it, we may expect a malarial influence which will make its mark on the general health of our population and upon family thrift, more than is merely tabulated in one of the varied forms of the disease. Many a constitution is so impaired as to find record afterward in untimely death by other diseases.

TYPHOID FEVER.

This numbers 373 cases, or an excess of 49 cases over the previous year. It is more identified with houses in close vicinage, and results largely from sewers, impure water and human excreta. Just as this report is being printed, a series of cases are occurring in an alms-house in Camden county, where typhus, as a well declared disease, is to be found. A fuller account will appear in the next report. It cannot be concealed, that malarial fevers are more frequent in some cities than formerly, and that we need closely to study the relations of the remittent and typhoid poisons with a view to their diminution, as also to determine the results of their united action on the same individual, or their possible combinations of influence upon the

atmosphere. We shall, ere long, be able to compare cities among themselves and rural and city districts, to see if a more accurate law as to prevalence can be substantiated.

SMALL-POX.

Last year we had not occasion to record a single death, although a very few cases occurred. This year we have also record of sporadic cases in localities where no death has occurred. There were several cases and some deaths in Salem city.

The chief epidemic has been in Camden city. As but few of the deaths occurred before July, the chief record will be in the next report. The authorities were tardy in dealing with the first cases of the disease and in securing general vaccination. When preventive measures were entered upon with vigor the cases and the mortality were diminished. Many of our cities still choose to repeat the experiment of waiting for an epidemic in order to secure general vaccination. The consequence is, that just as fast as a new crop of children can be found between five and ten years of age, the small-pox is sure to find material enough upon which to flourish. Some false conclusions are thus drawn as to the tendency of epidemics to occur at stated intervals of about seven years. We need much a public opinion which will consider neglect of vaccination a wrong, and which will at least compel it in the case of all identified with public schools. Because education is free that ought not to give the right to parents to make small-pox a free gift also. They are under obligations not thus to expose the children of others, while availing themselves of an educational gift, intended to be for all. The use of bovine virus removes the fear or prejudice as to human vaccine, but there is need that its source be assured, lest dishonest dealers substitute the human for the bovine lymph. We are at present making some inquiries into the reliability of supply and the care taken by those who advertise to furnish it fresh and pure each week.

SCARLET FEVER

has not been so prevalent as the former year, registering 573 instead of 627 deaths. Some of these latter must be associated with the epidemic of the former year. While no antidote exists

to the poison, isolation, avoidance of close rooms, proper airing and disinfection do much to limit the disease. Where a case occurs in a family, many now adopt a prophylactic treatment for other members of the household.

Cleansing gargles and washes have their sphere of use upon individuals, as well as upon surroundings of the patient, and internal remedies seem often to avail. No disease needs more careful and skillful care on part of the attendants, and there is no good reason why so many cases should occur.

MEASLES.

This ranks next to small-pox as the most contagious of the exanthems or skin zymotics. Although it is sometimes attended with a large rate of mortality, only 87 deaths from it are recorded this year, as against 77 of last year. It now seems strange to us that scarlet fever could ever have been classified with it. It is not strange that röthlen, or the so-called German measles, is sometimes taken for it, and so two attacks credited oftener than should be. It is a disease whose study is most important both in itself and in its bearing on acute and chronic lung affections.

WHOOPING COUGH,

has a mortality of 277, or 140 more than the previous year. In England it has, within the last three years, registered a much larger death rate than usual. It is one of those diseases which is probably often conveyed by the spittle or mouth secretions, which should not be concealed in handkerchief but find their place in some vessel having a disinfectant solution in it. It is largely under the control of medicine, and often neglected by parents with the idea that it is not dangerous. Even in recovery the lungs are often impaired by the dilitation which the air tubes or cells have suffered.

CROUP AND DIPHTHERIA,

the last year numbered 873 instead of 1,100 deaths; but the total is distressingly high. The observations of Wood and *others* seem to show that it is peculiarly a septic disease and depends much for its mortality, as well as, perhaps, for its inception,

upon abnormal and specific decomposition. Heat, moisture and filth fructify many kinds of disease and have very marked influence on the disease.

It is probable we shall yet find that sewer gas is not the chief factor, as it is a disease of the country as well as of cities, and that spores or animalculæ which flourish out of sunlight and in damp houses and amid peculiar atmospheric conditions, have much to do with the frequency and violence of the malady.

We think it is becoming more and more evident that croup and diphtheria do not differ in their pathological results, although difference arises from the seat and degree of exudation, and as to the local and constitutional character of certain epidemics.

DIARRHŒAL DISEASE,

showed an increase of three hundred and seventeen over the previous year. Both summers have been remarkable for high temperature and for certain conditions of humidity. There are so many factors that enter into the causation of diarrhœal disease as to render it necessary to study cities and country, and different cities, in comparison, with the inferences for a State aggregate.

CONSUMPTION.

The record of last year was 1,849 deaths; of this year, 2,166. It is high time that this disease took a more conspicuous place in the study of preventible diseases. The number of its victims is far greater than the usual feared diseases of children, while it generally removes those further advanced to adult life. The cure of the disease solely by medical treatment has not made great progress of late. But it is quite different as to our knowledge of causes and our powers of limiting the tendencies thereto. Damp soils and sudden changes of temperature are known as exciting causes. Acute and chronic pneumonia not infrequently start the tubercular deposit or prepare the system for its activity.

The law of heredity is better understood, so that by proper dealing with the child the tendency is overcome.

Air fouled either by gases or organic particles, or laden with fine dust of any kind, when breathed into the lungs is more or less an irritant. Where there is in it nothing to induce specific disease, both by *lowering* the tone of the system and by its local

irritation amid the delicate structures of the lungs, it gives rise to conditions favorable either to tubercular deposit or to the development of disease, of which the initial plasm is already deposited. Hence, there is no disease more worthy of the close study of the sanitarian, and of every one who would remove more fully from the risks of life one of its greatest perils, both from their own relation and from their own excessive mortality.

ACUTE LUNG DISEASE

also needs the sure, close study and observation. The record is 1,988, or 172 less than the former year. Adding these to the deaths by consumption, we have for lung disease an aggregate of 4,154, making over one-fourth of all of the diseases of special classes and over one-fifth of all the fatal diseases of the State. Surely in a State of such large industrial and factory development, political and social economy require us to look well to this deterioration of stock and vigor, as well as to the actual number of deaths. The deaths from the

BRAIN AND NERVOUS DISEASES

of children numbered 1,638, or 9 more than the previous year. This includes the large number of which convulsions form a frequent symptom. Adding to these 1,347 of adult brain diseases, an increase of 33 over the former year, and forming an aggregate of 2,985, it is well worthy of study how far the immense tax of this active age is increasing the liability to shock upon that high nervous organization with which mankind is endowed.

THE HEART AND CIRCULATION,

numbering 982, or an increase of 10 over the previous year, is also worthy of study in the same direction.

It is well known to physicians that rheumatism is often the excitant of heart disease, by the changes produced in the valves of the heart during its attack. Of this 66 deaths were recorded this year and 76 the previous year. From the fact that few die from acute rheumatism directly, the mortality it causes through *heart* disease is overlooked. It is now believed that the early and free use of salicylic acid in the beginning of the acute stage,

will often prevent those structural charges on the heart, which in later life produce death. If so we should ere long find a diminution of heart disease from this cause.

URINARY DISEASE.

These are marked by us in the office schedules so as to distinguish between those of the kidney and the bladder. Most of those tabulated come under disease of the kidney, and is generally returned as Nephritis or Bright's Disease. The studies of this disease have not merely reference to this one organ, for the lesion is often only secondary to disease of the brain, or nervous system, to failure in the digestive efforts, and to the use of intense irritants, of which alcohol and the various highly seasoned sauces are the representatives.

CANCER.*

The gradual increase of cancer, as a constitutional and distinctive disease, has been noted in the English returns and seems repeated in our own experience. Four hundred and twenty-five cases of the disease may seem small when compared with some of the other diseases; but it is believed to be more uniformly transmitted to offspring than almost any other malady and has an intricacy of history, as to causation and extension, that render it a subject for close study. We are watching, with interest, some returns that seem to indicate its more frequent occurrence in some sections than others, but it is too soon to even speak of probabilities.

PUERPERAL FEVER

claimed about sixty more victims this year than the last. The loss of a mother too often means a bereft household of little ones, whose orphanage is an affliction not only to the father but to society. The undoubted evidence we have of the communicability or portability of this disease, and its relations to erysipelas call for its closest study in the interests of State hygiene.

We desire to direct the attention of all those interested in Vital Statistics, to the importance of comparisons of cities and the country as to these various diseases, and also to comparison of various other *districts* with each other as preparatory to that

more extended study which will be desirable, when the number of data will exclude those sources of error which are not eliminated in small comparisons. Many of our physicians, as well as other citizens, are already seeing how important are the records thus secured. While there will be some crude deductions and inferences even on the part of those who lay claim to something of expert skill, yet it is enough that where the study has been most profound and the criticism the most searching, there the results have been most satisfactory. The social statist, no less than the physician looks to such records, as the mariner looks to his chart. With all the possibilities of error he knows that experience verifies the credibility of this great numerical map of population, and with graphic outlines works out the destines of families, of races, and of nations. The true student is led less and less to doubt the claim which it has to a place among determinable sciences and positive arts, while he may well question his own ability to grapple with the solution of the great life problems which are involved. The best encouragement of present progress in all directions is that material is being collected which will be of indispensable importance to great social, industrial and life studies, of which more than a preface is already at hand.

NUMBER OF MARRIAGES, BIRTHS AND DEATHS BY TOWNSHIPS.

Atlantic County.

	M.	B.	D.
Absecon	8	18	7
Atlantic City	33	120	93
Buena Vista	4	13	9
Egg Harbor City	20	44	28
Egg Harbor Township	15	52	72
Galloway	12	50	37
Hamilton	7	35	28
Hammonton	14	41	17
Mullica	2	12	12
Weymouth	0	16	11
	115	401	314

Bergen County.

	M.	B.	D.
Englewood	15	53	73
Franklin	12	28	20
Harrington	9	59	14
Hohokus	24	56	27
Lodi	20	101	63
Midland	5	34	25
New Barbadoes	46	137	79
Palisade	8	42	32
Ridgefield	15	53	41
Ridgewood	14	41	24
Saddle River	2	14	21
Union	8	68	50
Washington	15	62	41
	193	748	510

Burlington County.

	M.	B.	D.
Bass River	10	23	15
Beverly	26	82	54
Bordentown	47	124	90
Burlington	57	135	113
Chester	27	72	38
Chesterfield	3	27	24
Cinnaminson	13	66	41
Delran	5	12	12
Evesham	7	36	17
Eastampton	3	2	0
Florence	9	43	33
Little Egg Harbor	18	44	16
Lumberton	7	27	20
Mansfield	10	35	30
Medford	13	55	29
Mt. Laurel	1	23	17
New Hanover	14	45	23
Northampton	50	96	78
Pemberton	22	74	62
Randolph	1	13	5
Shamong	2	11	11
Southampton	21	38	24
Springfield	6	33	13
Washington	1	15	7
Westampton	1	27	14
Willingboro	2	13	10
Woodland	2	3	3
	378	1174	799

Camden County.

	M.	B.	D.
Camden City	424	716	803
Centre	12	63	41
Delaware	3	21	13
Gloucester	20	61	72
Gloucester City	41	140	84
Haddon	22	55	47
Stockton	29	52	62
Waterford	21	40	25
Winslow	6	56	37
	578	1204	1184

Cape May County.

	M.	B.	D.
ay City	22	57	24
	7	18	11
	13	64	27
	14	63	37
	17	30	27
	73	232	126

Cumberland County.

	M.	B.	D.
on	129	205	155
rcial	9	13	31
d	10	31	16
	11	28	18
d	25	77	34
ich	7	17	19
ell	13	31	28
	55	112	93
e River	10	49	36
le	90	201	174
eek	0	24	12
	359	783	611

Essex County.

	M.	B.	D.
e	16	54	45
ield	28	117	81
ll	15	42	36
	22	46	38
range	34	164	101
in	11	32	21
ston	2	19	13
n	13	80	20
air	40	120	81
	1141	3518	2553
	108	429	216
Orange	20	86	49
range	12	42	41
	1462	4699	3295

Gloucester County.

	M.	B.	D.
Clayton	23	57	34
Deptford	4	40	22
Franklin	13	60	34
Glassboro	15	70	30
Greenwich	16	70	52
Harrison	14	75	27
Logan	6	20	19
Mantua	7	40	23
Monroe	5	35	35
Washington	14	44	18
West Deptford	4	30	26
Woodbury	28	52	27
Woolwich	16	43	28
	165	638	375

Hudson County.

	M.	B.	D.
Bayonne	32	190	141
Guttenberg	10	11	27
Harrison	6	132	129
Hoboken	193	784	734
Jersey City	705	1523	2533
Kearney	3	35	24
North Bergen	9	34	164
Town of Union	45	142	121
Union	3	15	29
Weehawken	8	15	35
West Hoboken	14	143	88
	1023	3024	4025

Hunterdon County.

	M.	B.	D.
Alexandria	8	30	17
Bethlehem	10	37	45
Clinton	7	38	11
Delaware	24	58	31
East Amwell	12	35	24
Franklin	12	28	17
Frenchtown	13	19	10
High Bridge	14	50	21
Holland	8	45	28
Kingwood	1	44	15
Lambertville	42	79	78
Lebanon	33	52	36
Raritan	30	64	43
Readington	21	72	40
Tewksbury	23	40	19
Town of Clinton	9	11	12
Union	7	17	10
West Amwell	2	20	18
	276	739	475

Mercer County.

	M.	B.	D.
Chambersburg	39	98	109
East Windsor	17	43	35
Ewing	6	23	30
Hamilton	20	61	54
Hopewell	33	88	41
Lawrence	14	59	47
Princeton	24	105	81
Trenton	326	563	618
Washington	6	15	18
West Windsor	6	16	15
	491	1071	1048

Middlesex County.

	M.	B.	D.
Cranberry	20	33	28
East Brunswick	17	92	48
Madison	4	17	22
Monroe	27	50	44
New Brunswick	116	453	269
North Brunswick	11	27	20
Perth Amboy	22	204	83
Piscataway	26	70	46
Raritan	19	50	46
Sayreville	1	17	26
South Amboy	15	61	52
South Brunswick	13	56	49
Woodbridge	10	80	44
	301	1210	777

Monmouth County.

	M.	B.	D.
Atlantic	9	24	6
Eatontown	28	52	41
Freehold	54	77	67
Holmdel	7	21	13
Howell	29	74	44
Manalapan	12	38	34
Marlboro	10	38	27
Matawan	18	62	48
Middletown	24	93	62
Millstone	24	43	34
Neptune	38	88	63
Ocean	46	156	83
Raritan	42	87	61
Shrewsbury	52	139	73
Upper Freehold	19	56	49
Wall	48	121	47
	460	1169	752

Morris County.

	M.	B.	D.
Boonton	28	38	43
Chatham	14	69	74
Chester	15	64	28
Hanover	14	54	41
Jefferson	6	41	27
Mendham	11	28	21
Montville	6	23	10
Morris	39	130	128
Mount Olive	22	55	26
Passaic	5	32	16
Pequannock	18	47	27
Randolph	61	140	108
Rockaway	47	168	90
Roxbury	13	47	33
Washington	11	76	18
	310	1012	685

Ocean County.

	M.	B.	D.
Berkeley	3	15	12
Brick	21	56	42
Dover	17	49	24
Eagleswood	5	15	7
Jackson	14	86	19
Lacey	12	19	7
Manchester	7	29	11
Ocean	2	8	3
Plumsted	9	49	16
Stafford	9	25	8
Union	4	18	13
	103	319	162

Passaic County.

	M.	B.	D.
Acquackanonk	4	35	28
Little Falls	9	17	31
Manchester	2	13	13
Passaic	49	216	142
Paterson	431	1322	1174
Pompton	34	40	21
Wayne	6	23	22
West Milford	31	75	37
	566	1741	1468

Salem County.

	M.	B.	D.
Elsinboro	0	12	11
Lower Alloways Creek	15	11	17
Lower Penn's Neck	20	25	29
Mannington	2	58	49
Pilesgrove	26	62	48
Pittsgrove	11	67	16
Quinton	2	46	20
Salem	33	83	76
Upper Alloways Creek	15	44	23
Upper Penns' Neck	24	97	52
Upper Pittsgrove	8	20	21
	156	525	362

Somerset County.

	M.	B.	D.
Badminster	18	44	22
Bernards	14	59	35
Branchburg	5	27	19
Bridgewater	66	170	104
Franklin	17	60	55
Hillsborough	11	63	44
Montgomery	16	51	18
North Plainfield	7	71	36
Warren	8	19	10
	162	564	343

Sussex County.

	M.	B.	D.
Andover	7	21	8
Byram	20	30	17
Frankford	15	26	25
Greene	1	8	8
Hardyston	14	21	39
Hampton	2	15	9
Lafayette	19	8	8
Montague	5	21	16
Newton	25	53	30
Sandyston	9	24	16
Sparta	13	27	28
Stillwater	17	21	19
Vernon	9	4	14
Walpack	5	17	5
Wantage	16	25	42
	177	321	284

Union County.

	M.	B.	D.
Clark	2	.....	2
Cranford	3	10	11
Elizabeth	158	679	440
Fanwood	6	20	16
Linden	5	45	28
New Providence	6	9	11
Plainfield	57	166	98
Rahway	59	132	116
Springfield	6	19	23
Summit	8	40	27
Union	4	48	28
Westfield	14	48	40
	328	1216	840

Warren County.

	M.	B.	D.
Allamuchy	1	4	6
Belvidere	26	41	31
Blairstown	6	42	12
Franklin	21	35	20
Frelinghuysen	11	20	14
Greenwich	18	66	52
Hackettstown	15	46	29
Hardwick	2	12	7
Harmony	4	31	12
Hope	9	31	20
Independence	12	20	12
Knowlton	7	41	19
Lapatcong	4	43	22
Mansfield	9	35	29
Oxford	28	130	78
Pahaquarry	0	10	4
Phillipsburg	58	208	126
Town of Washington	24	55	28
Washington	5	20	11
	260	890	532

Totals of Marriages, Births and Deaths for all the Counties.

	M.	B.	D.
ic	115	401	314
	193	748	510
gton	378	1174	799
n	578	1204	1184
day	73	282	126
rland	359	783	611
	1462	4699	3295
ster	165	638	375
n	1023	3024	4025
rdon	276	739	475
	491	1071	1048
sex	301	1210	777
outh	460	1169	752
	310	1012	685
	103	319	162
	566	1741	1468
	156	525	362
set	162	564	343
	177	321	284
	328	1216	840
n	260	890	532
tal for the State.	7936	23680	18967

Summary of Totals for whole State for the past three years.

	M.	B.	D.
	5375	19427	14085
	7096	23116	20440
	7936	23680	18967

der former law.

Return of Deaths from all Causes and certain specified Diseases, in the Counties of the State of New Jersey, for the year ending June 30th, 1880.

COUNTIES OF NEW JERSEY.	DEATHS AT ALL AGES.							Population, census of 1880.	Death rate per 1000.	PRINCIPAL CAUSES OF DEATH.																			Total deaths from these diseases.	Death rate per 1000 from these diseases.
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.			Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhœal diseases.	Consumption.	Acute lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult Brain and Spinal diseases.	Erysipelas.	Digestive and Intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.		
Atlantic	90	42	29	76	75	2	314	18,706	16.78	.....	1	.....	1	.....	2	11	52	48	19	19	12	5	29	1	29	10	1	4	.....	.....
Bergen	110	67	50	172	107	4	510	36,790	13.86	22	7	.....	10	1	4	10	46	94	58	38	25	18	40	5	31	14	.....	6	.....	.....
Burlington	165	93	77	224	230	10	799	55,403	14.42	8	16	1	4	.....	5	53	68	150	60	47	61	30	59	10	52	15	5	13	.....	.....
Camden	338	168	115	347	206	10	1,184	62,941	18.81	11	35	10	13	1	9	45	185	168	108	87	61	24	78	2	53	30	1	11	.....	.....
Cape May	37	19	17	22	29	2	126	9,765	12.90	1	4	.....	8	.....	3	7	21	12	8	13	1	3	11	1	10	7	1	.....	.....	.....
Cumberland	148	90	43	160	165	5	611	37,694	16.20	2	13	.....	18	.....	5	36	65	108	71	37	28	9	45	2	38	17	3	7	.....	.....
Essex	800	461	286	1,130	613	5	3,295	189,819	17.35	67	90	.....	43	7	15	172	384	511	413	303	165	110	239	16	143	76	7	39	.....	.....
Gloucester	91	47	32	103	98	4	375	25,886	14.48	6	13	.....	7	1	2	21	35	45	39	19	25	8	28	1	33	7	3	2	.....	.....
Hudson	1,034	812	407	1,287	478	7	4,025	187,950	21.41	86	50	.....	211	34	25	237	486	516	448	532	183	114	177	22	162	67	12	54	.....	.....
Hunterdon	75	52	51	134	158	5	475	38,568	12.31	2	14	.....	8	.....	4	36	39	67	43	11	43	8	54	1	28	13	3	3	.....	.....
Mercer	219	120	119	331	235	24	1,048	58,058	18.05	5	19	.....	88	3	7	13	91	174	85	63	53	23	87	6	72	20	3	13	.....	.....
Middlesex	201	93	75	213	191	4	777	52,286	14.86	16	11	.....	8	6	2	36	87	102	83	47	37	25	54	6	38	23	1	5	.....	.....
Monmouth	195	87	56	193	206	15	752	55,535	13.54	1	8	.....	6	.....	5	22	102	178	44	57	42	24	59	2	56	15	2	15	.....	.....
Morris	143	86	52	210	185	9	685	50,867	13.26	20	10	.....	10	10	7	18	60	87	91	43	42	21	80	4	40	20	4	14	.....	.....
Ocean	33	16	14	50	48	1	162	14,455	11.20	1	4	.....	1	.....	4	6	12	28	11	6	6	1	17	2	18	5	2	2	.....	.....
Passaic	377	288	182	395	220	6	1,468	68,716	21.36	12	22	.....	85	22	11	70	238	180	146	137	64	32	73	11	56	28	3	19	.....	.....
Salem	76	33	39	98	110	6	362	24,580	14.72	2	8	3	2	.....	2	15	29	49	46	16	11	8	38	7	24	12	2	6	.....	.....
Somerset	71	31	22	99	118	2	343	27,161	12.62	5	2	.....	2	.....	1	4	28	44	39	21	29	15	34	5	28	11	5	4	.....	.....
Sussex	39	30	39	81	92	3	284	23,553	12.05	7	12	.....	15	.....	.....	8	11	38	37	21	15	5	35	1	12	8	2	5	.....	.....
Union	204	109	61	261	200	5	840	55,571	15.11	15	18	1	3	2	12	32	86	115	83	60	51	17	73	2	45	21	2	15	.....	.....
Warren	120	97	50	139	117	9	532	36,588	14.54	4	16	.....	30	.....	5	21	41	50	56	61	30	16	38	2	37	6	2	7	.....	.....
	4,566	2,841	1,816	5,725	3,881	138	18,967	1130,892	16.77	293	373	15	573	87	130	873	2166	2714	1988	1038	982	516	1347	109	1005	425	64	244	15,742	13.74

5,000 *for the year ending June 30th, 1880.*

Incorporated Cities of the State having by the Census of 1880 over 5,000. Statistical Divisions.	DEATHS AT ALL AGES.							Population, census of 1880.	Death rate per 1000.	PRINCIPAL CAUSES OF DEATH.																			Total deaths from these diseases.	Death rate per 1000 from these diseases.
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.			Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhœal diseases.	Consumption.	Acute Lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult Brain and Spinal diseases.	Erysipelas.	Digestive and Intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.		
Burlington Co.																													
Bordentown	14	10	10	29	27	.....	90	5,334	16.89	.....	1	.....	.....	.....	1	1	9	24	6	11	9	4	4	.....	5	1	.....	2	.....	.....
Burlington	22	18	12	36	22	3	113	7,237	15.61	.....	1	.....	1	.....	.....	3	12	28	12	5	5	8	8	2	4	.....	1	1	.....	.....
Camden Co.																													
Camden	226	131	85	246	106	9	803	41,658	19.27	6	25	10	9	1	7	37	120	115	71	66	37	17	51	.....	25	24	1	6	.....	.....
Gloucester City	28	14	6	22	14	.....	84	5,347	15.70	.....	1	.....	.....	.....	1	6	18	17	5	6	3	.....	5	.....	3	1	.....	1	.....	.....
Cumberland Co.																													
Bridgeton	48	15	11	43	38	.....	155	8,729	17.75	.....	2	.....	4	.....	3	9	21	28	14	9	6	4	10	2	6	3	1	4	.....	.....
Millville	39	55	15	38	24	3	174	7,660	22.71	.....	2	.....	13	.....	.....	21	28	36	22	10	3	3	6	.....	8	1	1	.....	.....	.....
Essex Co.																													
East Orange	22	10	13	26	30	.....	101	8,349	12.09	2	7	.....	1	1	.....	3	11	15	11	4	8	4	4	2	4	.....	.....	4	.....	.....
Newark	641	373	222	899	414	4	2,553	136,400	18.71	48	72	.....	35	3	11	144	298	396	308	251	121	82	178	5	115	62	5	27	.....	.....
Orange	55	30	22	77	32	.....	216	13,206	16.35	2	3	.....	2	1	1	3	39	47	37	16	6	4	13	2	10	4	.....	1	.....	.....
Hudson Co.																													
Bayonne	37	33	2	53	16	.....	141	9,372	15.04	1	.....	.....	3	.....	2	10	19	22	14	16	5	1	5	1	6	3	.....	2	.....	.....
Hoboken	208	150	64	244	68	.....	734	30,999	23.71	5	8	.....	23	5	6	49	107	76	93	192	37	27	28	7	29	12	3	13	.....	.....
Jersey City	644	326	267	798	295	4	2,533	120,728	20.98	57	31	.....	148	23	16	164	292	344	269	265	114	66	108	12	101	35	8	31	.....	.....
West Hoboken	27	14	8	25	14	.....	88	5,441	16.17	1	2	.....	3	.....	.....	4	9	7	8	16	8	1	1	.....	6	3	1	1	.....	.....
Harrison	30	17	14	53	13	2	129	5,510	23.41	7	2	.....	1	1	.....	.....	11	20	19	12	6	3	6	.....	5	2	.....	2	.....	.....
Town of Union	26	41	17	23	14	.....	121	5,849	20.64	4	2	.....	17	3	.....	5	14	12	9	14	4	3	7	.....	4	3	.....	1	.....	.....
Mercer Co.																													
Trenton	138	75	75	196	118	16	618	29,010	20.66	5	5	.....	66	1	2	6	54	108	43	40	31	16	38	3	33	11	3	7	.....	.....
Chambersburg	25	14	19	38	9	4	109	5,437	20.04	.....	.....	.....	14	1	2	2	9	17	12	7	3	.....	6	1	7	2	.....	1	.....	.....
Middlesex Co.																													
New Brunswick	93	32	24	65	55	.....	269	17,167	15.66	2	6	.....	1	6	.....	8	45	36	27	24	14	9	17	4	13	11	.....	1	.....	.....
Morris Co.																													
Morristown	22	11	6	52	36	1	128	6,838	18.71	2	..	.....	.....	.....	.....	4	17	19	9	6	6	5	34	.....	5	3	1	.....	.....	.....
Passaic Co.																													
Passaic City	43	26	13	44	14	2	142	6,532	21.73	1	2	.....	1	.....	.....	10	22	14	13	22	8	3	3	3	8	1	.....	4	.....	.....
Paterson	305	247	152	296	170	4	1,174	50,877	23.07	7	20	.....	82	22	11	56	202	152	119	101	43	24	62	3	37	22	2	12	.....	.....
Salem Co.																													
Salem	23	8	10	18	16	1	76	5,057	15.02	.....	1	.....	.....	.....	2	8	10	8	8	1	.....	.....	8	.....	6	.....	.....	3	.....	.....
Union Co.																													
Elizabeth	110	74	36	131	86	3	440	28,229	15.58	5	6	.....	2	2	9	24	52	49	44	30	24	7	35	.....	21	11	1	7	.....	.....
Plainfield	24	9	10	36	18	1	98	8,126	12.06	2	4	.....	.....	.....	.....	2	13	19	9	7	5	3	9	.....	5	1	1	3	.....	.....
Railway	32	8	5	34	37	.....	116	6,454	17.97	2	.....	.....	.....	.....	2	1	9	26	12	6	7	.....	10	1	15	5	.....	1	.....	.....
Warren Co.																													
Phillipsburg	39	25	21	21	20	.....	126	7,180	17.54	.....	2	.....	15	.....	3	11	9	11	6	22	3	2	10	.....	10	1	.....	1	.....	.....
	2,921	1,963	1,139	3,543	1,706	57	11,331	563,626	19.41	159	210	10	441	70	79	591	1450	1646	1200	1168	521	296	667	48	491	222	28	136	9,433	18.16

Death Rate per 1000 *of Counties, Based on Census of* 1880, *for period from June* 30*th*, 1878 *to June* 30*th*, 1879.

(As the present census affords the most correct estimate of population for the previous year, we give a re-calculation of the death rate for the year ending July 1st, 1879, on this basis, in order to aid in future comparisons.)

COUNTIES.	Deaths.	Population.	Death rate, per 1000.
Atlantic	302	18,708	16.14
Bergen	636	36,790	17.28
Burlington	989	56,403	17.85
Camden	1,059	62,941	16.82
Cape May	120	9,765	12.28
Cumberland	628	37,694	16.66
Essex	3,947	189,819	20.79
Gloucester	431	25,866	16.64
Hudson	3,957	187,959	21.05
Hunterdon	527	38,568	13.66
Mercer	1,109	58,056	19.10
Middlesex	837	52,226	16.00
Monmouth	926	55,635	16.67
Morris	829	50,867	16.29
Ocean	217	14,455	15.01
Passaic	1,287	68,716	18.72
Salem	392	24,580	15.94
Somerset	429	27,161	15.79
Sussex	330	23,553	14.01
Union	966	55,571	17.38
Warren	522	36,566	14.28
Death rate per 1000 of whole State			18.67
Death rate per 1000 of specified diseases			13.96

Death Rate per 1000 *of Cities, Based on Census of* 1880, *for period from July* 1*st*, 1878 *to July* 1*st* 1879.

CITIES.	Deaths.	Population.	Death rate, per 1000.
Burlington county.			
Bordentown	86	5,334	16.12
Burlington	154	7,237	21.27
Camden county.			
Camden	673	41,658	16.15
Gloucester City	72	5,347	13.46
Cumberland county.			
Bridgeton	133	8,729	15.23
Millville	137	7,660	17.88
Essex county.			
East Orange	126	8,349	15.09
Newark	3,110	136,400	22.84
Orange	215	13,206	16.28
Hudson county.			
Bayonne	156	9,372	16.64
Hoboken	669	30,990	21.58
Jersey City	2,517	120,728	20.84
West Hoboken	95	5,441	17.46
Mercer county.			
Trenton	653	29,910	21.83
Middlesex county.			
New Brunswick	325	17,167	18.93
Morris county.			
Morristown	114	6,838	16.67
Passaic county.			
Paterson	994	50,877	19.53
Union county.			
Elizabeth	472	28,229	16.72
Plainfield	130	8,126	15.99
Rahway	169	6,454	26.18
Warren county.			
Phillipsburg	102	7,180	14.20

Return of Deaths from all Causes, and certain specified Diseases, in the Statistical Divisions of the State of New Jersey, for the year ending June 30th, 1880.

County of ATLANTIC. Population.....18,706. Statistical Divisions.	DEATHS AT ALL AGES.								PRINCIPAL CAUSES OF DEATH.																			
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.	Population, census of 1880.	Death rate per 1000.	Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhœal diseases.	Consumption.	Acute Lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult Brain and Spinal diseases.	Erysipelas.	Digestive and Intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.
Absecon	1			3	3		7	507								1		2					2		1			1
Atlantic City	38	12	5	22	16		93	5,477	16.98		1			1			24	11	2	8	4	3	3	1	7	4		1
Buena Vista	2	1	1	3	2		9	885										1	1		1		2		1			
Egg Harbor City	7	6		6	9		28	1,232							1	1	4	1	3	1			3		2		1	1
Egg Harbor Township	22	11	5	15	19		72	*3,570								2	16	15	3	4	4	1	7		6	1		
Galloway	9	5	3	12	8		37	†2,337					1		1		4	7	2	2	1		2		7	2	1	
Hamilton	8	1	6	8	5		28	1,464								3	2	2	2	2	1	1	3		1	1		1
Hammonton	1	1	4	2	7	2	17	1,776								2	1	4	3				3		3	2		
Mullica	1	3	3	3	2		12	717								1		4	1	2			1		1	1		
Weymouth	1	2	2	2	4		11	741								1	2	1	1		1		3		1			
Death rate per 1000 of county									16.78																			
Death rate per 1000 of county, exclusive of cities over 5000									16.70																			
	90	42	29	76	75	2	314				1		1	1	2	11	52	48	19	19	12	5	29	1	29	11	1	4

*Exclusive of Absecon. †Exclusive of Egg Harbor city.

Return of Deaths from all Causes and certain specified Diseases, in the Statistical Divisions of the State of New Jersey, for the year ending June 30th, 1880.

County of BERGEN. Population.....36,700 Statistical Divisions.	DEATHS AT ALL AGES.									PRINCIPAL CAUSES OF DEATH.																			
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.	Population, census of 1880.	Death rate per 1000.	Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhœal diseases.	Consumption.	Acute Lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult Brain and Spinal diseases.	Erysipelas.	Digestive and Intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.
Englewood	16	16	7	21	12	1	73	4,076	.....	2	1	.....	2	.....	1	2	12	9	12	3	5	2	3	.....	4	1	.....	3
Franklin	3	3	4	5	4	1	20	2,206	.....	.....	.....	.....	.....	.....	.....	3	1	5	3	2	1	1	1	.....	.....	1	.....	.....	.....
Harrington	2	.....	.....	7	5	.....	14	2,570	.....	.....	.....	.....	1	.....	.....	.....	1	5	.....	.....	.....	.....	4	.....	.....	1	.....	.....	.....
Hohokus	1	2	2	8	7	1	21	2,920	.....	.....	.....	.....	1	.....	.....	1	1	7	2	.....	.....	.....	4	.....	2	1	.....	.....	.....
Lodi	18	8	3	18	13	.....	63	4,071	.....	2	2	.....	.....	.....	.....	2	2	6	8	2	2	2	4	2	2	4	.....	.....	.....
Midland	4	2	2	13	4	.....	25	1,591	.....	1	.....	.....	.....	.....	.....	.....	2	6	1	1	3	.....	5	.....	.....	.....	.....	.....	.....
New Barbadoes	20	11	10	24	14	.....	79	4,250	.....	1	.....	.....	1	.....	.....	.....	1	16	11	5	3	5	7	1	7	1	.....	.....	.....
Palisade	4	2	5	12	9	.....	32	2,303	.....	2	.....	.....	.....	.....	1	.....	2	5	3	1	3	1	.....	1	3	3	.....	2
Ridgefield	8	5	3	16	9	.....	41	2,953	.....	2	.....	.....	1	.....	.....	.....	2	7	3	3	3	1	3	.....	1	1	.....	.....	.....
Ridgewood	2	4	6	7	5	.....	24	1,478	.....	2	1	.....	1	.....	1	1	.....	6	3	1	1	1	2	1	2	.....	.....	.....	.....
Saddle River	3	9	2	4	3	.....	21	1,555	.....	.....	.....	.....	3	.....	.....	.....	.....	3	.....	2	2	.....	.....	.....	.....	.....	1	.....	.....
Union	17	3	3	14	13	.....	50	3,164	.....	6	2	.....	.....	1	.....	1	6	7	2	4	1	2	2	.....	4	.....	.....	.....	.....
Washington	6	2	.....	23	9	1	41	2,853	.....	3	1	.....	.....	.....	1	1	.....	12	5	2	1	.....	7	.....	1	2	.....	1	.....
Death rate per 1000 of county	.....	.....	.....	.....	.....	.....	.....	.....	13.86	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	110	67	50	172	107	4	510	.....	.....	22	7	.....	10	1	4	10	46	94	56	35	25	18	40	5	31	14	.....	6

Return of Deaths from all Causes and certain specified Diseases, in the Statistical Divisions of the State of New Jersey, for the year ending June 30th, 1880.

County of BURLINGTON.

Population.....55,403

Statistical Divisions.	DEATHS AT ALL AGES.									PRINCIPAL CAUSES OF DEATH.																									
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Unlisted.	Total.	Population, census of 1880.	Death rate per 1000.	Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhœal diseases.	Consumption.	Acute Lung diseases.	Brain and nervous diseases of children.	Diseases of heart and and circulation.	Urinary diseases.	Adult Brain and Spinal diseases.	Erysipelas.	Digestive and Intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.							
Bass River	8		1	3	3		15	1,006			1				1		2	3			1				1									
Beverly	4	4	3	1	4		14	†1,369		1																								
Beverly City		10	6	4	13	1	42	1,759								1	6	17	4	2														
Bordentown	14	10	10	29	27		93	5,314	16.89		1				1		1	9	24	2	4	11	3	4										
Burlington	22	18	12	36	22	3	113	7,237	15.61		1		1		1		3	12	28	12	5	7	5	8	1	4								
Chester	6	4	2	9	12	2	35	2,853		1			1			1			6	1	1		1	1		4								
Chesterfield	3	1	3	6	10	1	24	1,525							1				6		1		1	1										
Cinnaminson	6	6	2	6	14	1	41	2,184									1	6	12	1			1	1		4								
Delvan	5	5		2	1		13	1,760											5		1		1	1										
Evesham	7	2		1	6		17	1,602			1					1			3		1		1	1										
Florence	7	5	4	11	5	1	33	1,528		1	1		1		1	1	4	8	5	1	4	1	1	1										
Little Egg Harbor	4		3	4	4		16	1,881								1	1	2	3		1													
Lumberton	14	3	2	6	5		29	1,699			1						2	2		1		1		1										
Mansfield	7		1	13	8	1	30	1,648			1	3			1		1	7	1	1	1	2	3											
Medford	7	1		10	11		29	1,980			1						4	6	4			1	1											
Mount Laurel	3		1	7	6		17	1,739			1	1					2	2			1		1											
New Hanover	6	2	3	4	8		23	2,373										6	3	1	1	1	1											
Northampton	16	5	4	23	30		78	4,630			1						6	16	3	5	5	4	1	1										
Pemberton	14	6	2	18	22		62	2,885		1	3		1			2	10	7	3	3	4	7	1		7	1								
Randolph	3	1		1			5	428					1				2		2															
Shamong	2		1	4	4		11	1,097									1	4	1				1											
Southampton	5	5	2	7	5		24	2,270								1	1	5	7	3	2	1		1										
Springfield	3	1	4	4	1		13	1,880			2					2	1	1	1	1	1													
Washington	1	1	1	1	3		7	389									1	3	1															
Westhampton	6	1		4	3		14	715			1					1	1	2			1		1	1		1								
Willingboro	2	1	2	3	2		10	743								1	3	1			1		1	1										
Woodland			1	1	1		3	325										2																
Death rate per 1000 of county									14.42																									
Death rate per 1000 of county, exclusive of cities of over 5000									13 91																									
	165	93	77	224	230	10	799			8	10		4		5	53	68	150	60	47	60	30	59	19	52	15	5	11						

†Exclusive of city.

Return of Deaths from all Causes and certain specified Diseases, in the Statistical Divisions of the State of New Jersey, for the year ending June 30th, 1880.

County of CAMDEN. Population.....62,941. Statistical Divisions.	DEATHS AT ALL AGES.							Population, census of 1880.	Death rate per 1000.	PRINCIPAL CAUSES OF DEATH.																	
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.			Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhoeal diseases.	Consumption.	Acute Lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult Brain and Spinal diseases.	Erysipelas.	Digestive and Intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.
Camden	226	131	85	246	106	9	803	41,658	19.27	6	25	10	9	1	7	37	120	115	71	66	37	17	51	.....	25	24	1	6
Centre	14	5	5	8	8	1	41	1,538	.....	1	4	.....	.....	.....	.....	.....	7	2	8	3	.....	2	2	.....	4	.....	.....	2
Delaware	2	2	1	5	3	.....	13	1,481	.....	.....	.....	.....	.....	.....	.....	.....	1	2	3	1	2	.....	.....	.....	.....	1	.....	.....
Gloucester Township	12	1	5	24	30	.....	72	2,527	.....	.....	4	.....	.....	.....	.....	.....	8	9	5	.....	9	2	8	2	4	1	.....	.....
Gloucester City	28	14	6	22	14	.....	84	5,347	15.70	.....	1	.....	.....	.....	1	6	18	17	5	6	3	.....	5	.....	3	1	.....	1
Haddon	12	4	4	13	14	.....	47	2,551	.....	1	.....	.....	1	.....	1	1	3	10	6	3	2	1	3	.....	7	1	.....	1
Merchantville Borough	.....	.....	.....	.....	.....	.....	.....	†3,003	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Stockton	24	7	4	10	11	.....	62	439	.....	3	1	.....	.....	.....	.....	.....	21	9	2	2	5	1	3	.....	5	2	.....	.....
Waterford	8	2	2	6	7	.....	25	2,077	.....	.....	.....	.....	1	.....	.....	1	1	3	3	3	2	.....	3	.....	1	.....	.....	1
Winslow	12	2	3	7	13	.....	37	2,230	.....	.....	.....	.....	2	.....	.....	.....	6	1	5	3	1	1	5	.....	4	.....	.....	.....
Death rate per 1000 of county	.....	.....	.....	.....	.....	.....	.....	.....	18.81	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Death rate per 1000 of county, exclusive of cities over 5000	.....	.....	.....	.....	.....	.....	.....	.....	18.63	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	338	168	115	347	206	10	1,184	.....	.....	11	35	10	13	1	9	45	185	168	108	87	61	24	80	2	53	30	1	11

†To be included in Stockton township.

Return of Deaths from all Causes and certain specified Diseases, in the Statistical Divisions of the State of New Jersey, for the year ending June 30th, 1880.

County of CAPE MAY. Population.....9,765. Statistical Divisions.	DEATHS AT ALL AGES.									PRINCIPAL CAUSES OF DEATH.																			
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.	Population, census of 1880.	Death rate per 1000.	Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhœal diseases.	Consumption.	Acute Lung disease.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult Brain and spinal diseases.	Erysipelas.	Digestive and Intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.
Cape May City	6	5	5	5	3	.....	24	1,699	.....	1	1	.....	4	.....	.....	1	3	.....	1	3	.....	1	2	1	2	2	.....	.....
Dennis	4	1	.....	3	3	.....	11	1,812	.....	.....	1	.....	.....	.....	1	.....	3	1	1	.....	.....	.....	.....	.....	1	2	.....	.....
Lower	13	6	3	2	3	.....	27	1,977	.....	.....	1	.....	3	.....	2	.....	6	4	.....	.....	.....	.....	1	.....	.....	1	.....	.....
Middle	8	5	2	2	13	2	32	2,575	.....	.....	.....	.....	1	.....	.....	6	6	4	4	5	1	1	4	.....	5	1	.....	.....
Upper	6	2	2	9	8	.....	27	1,702	.....	.....	1	.....	.....	.....	.....	.....	3	2	2	3	.....	1	4	.....	2	1	1	.....
Cape May Point	.....	.....	.....	.....	.....	.....	.....	†198	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Death rate per 1000 for county	.....	.....	.....	.....	.....	.....	.....	.....	12.90	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	37	19	17	22	29	2	126	.....	.....	1	4	.....	8	.....	3	7	21	12	8	13	1	3	11	1	10	7	1	.....

†Included in population of Lower township.

Return of Deaths from all Causes and certain specified Diseases, in the Statistical Divisions of the State of New Jersey, for the year ending June 30th, 1880.

County of CUMBERLAND. Population.....37,694. Statistical Divisions.	DEATHS AT ALL AGES.									PRINCIPAL CAUSES OF DEATH.																					
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.	Population, census of 1880.	Death rate per 1000.	Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhœal diseases.	Consumption.	Acute Lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult Brain and Spinal diseases.	Erysipelas.	Digestive and Intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.				
Bridgeton	48	15	11	43	38	.....	155	8,729	17.75	.....	2	.....	4	.....	3	9	21	28	14	9	6	4	10	2	6	3	1	4				
Commercial	11	1	6	6	7	.....	31	2,265	.....	.....	.....	.....	.....	.....	.....	4	1	6	4	2	.....	.....	4	.....	1	.....	.....	.....				
Deerfield	5	1	.....	2	7	1	16	1,643	.....	.....	.....	.....	.....	.....	.....	.....	2	2	4	1	.....	.....	2	.....	.....	.....	.....	.....				
Downs	5	.....	.....	6	7	.....	18	1,687	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	5	1	2	.....	.....	.....	.....	.....	1	.....				
Fairfield	7	3	1	10	12	1	34	3,215	.....	1	4	.....	.....	.....	.....	.....	4	2	.....	3	3	.....	5	.....	.....	1	.....	.....				
Greenwich	1	4	1	6	7	.....	19	1,245	.....	.....	2	.....	.....	.....	2	.....	1	3	3	.....	.....	.....	1	.....	.....	.....	.....	1				
Hopewell	4	.....	.....	6	13	.....	23	1,764	.....	.....	.....	.....	.....	.....	.....	.....	2	7	2	.....	4	1	4	.....	.....	.....	.....	.....				
Landis	18	8	6	29	32	.....	93	6,005	.....	.....	2	.....	1	.....	.....	.....	4	14	12	9	6	1	9	.....	5	10	.....	2				
Maurice River	8	2	2	11	13	.....	36	2,374	.....	.....	1	.....	.....	.....	.....	1	1	2	4	2	3	.....	3	.....	1	1	.....	.....				
Millville	39	55	15	38	24	3	174	7,660	22.71	.....	2	.....	13	.....	.....	21	28	36	22	10	3	3	6	.....	8	1	1	.....				
Stoe Creek	2	1	1	3	5	.....	12	1,107	.....	1	.....	.....	.....	.....	.....	1	1	.....	1	.....	1	.....	1	.....	2	.....	.....	1				
Death rate per 1000 of county	.....	.....	.....	.....	.....	.....	.....	.....	16.20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....				
Death rate per 1000 of county, exclusive of cities of over 5000	.....	.....	.....	.....	.....	.....	.....	.....	13.23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....				
	148	90	43	160	165	5	611	.....	.....	2	13	.....	18	.....	5	36	65	108	71	37	28	9	45	2	38	17	3	8				

Return of Deaths from all Causes and certain specified Diseases, in the Statistical Divisions of the State of New Jersey, for the year ending June 30th, 1880.

County of ESSEX. Population.....139,819. Statistical Divisions.	DEATHS AT ALL AGES.									PRINCIPAL CAUSES OF DEATH.																				
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.	Population, census of 1880.	Death rate per 1000.	Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhœal diseases.	Consumption.	Acute Lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult Brain and Spinal diseases.	Erysipelas.	Digestive and Intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.
Belleville	9	10	6	9	11	.....	45	3,004	.....	5	.....	.....	.....	.....	1	7	2	4	7	3	2	2	1	1	2	1	.....	.....
Bloomfield	17	10	3	21	29	1	81	5,748	.....	2	.....	.....	2	1	1	.....	10	6	16	6	6	3	9	2	1	2	.....	1
Caldwell	6	1	1	11	17	.....	36	3,167	.....	2	1	.....	.....	.....	.....	2	3	5	5	2	4	1	4	.....	1	1	.....	1
Clinton	9	2	4	9	14	.....	38	2,742	.....	1	.....	.....	.....	.....	.....	4	2	6	4	3	3	2	5	1	1	1	.....	.....
East Orange	12	10	13	26	30	.....	101	8,340	12.09	2	7	.....	1	1	.....	3	11	15	11	4	8	4	4	2	4	.....	.....	4
Franklin	3	3	1	3	6	.....	21	1,617	.....	1	.....	.....	.....	.....	.....	1	1	3	4	3	.....	.....	4	1	1	1	.....	.....
Livingston	4	2	.....	3	4	.....	13	1,401	.....	.....	.....	.....	.....	.....	.....	.....	3	3	1	2	1	1	2	.....	1	.....	.....	.....
Millburn	2	2	1	7	8	.....	20	1,743	.....	1	.....	.....	2	.....	.....	.....	1	1	2	2	.....	.....	7	.....	.....	.....	1	.....
Montclair	18	5	4	30	24	.....	81	5,146	.....	1	5	.....	.....	.....	.....	5	7	10	8	5	4	4	9	.....	3	3	.....	3
Newark	641	373	222	899	414	4	2,553	136,400	18.71	48	72	.....	35	3	11	144	298	396	308	251	121	82	178	5	115	62	5	27
Orange	55	30	22	77	32	.....	216	13,206	16.35	2	3	.....	2	1	1	3	39	47	37	16	6	4	13	2	10	4	.....	1
South Orange	9	8	3	15	14	.....	49	3,911	.....	2	2	.....	1	1	.....	2	4	6	5	2	4	3	2	1	1	1	.....	1
West Orange	5	5	6	15	10	.....	41	3,385	.....	.....	1	.....	.....	.....	1	1	3	9	5	4	4	3	1	1	3	.....	1	1
Death rate per 1000 for county	.....	.....	.....	.....	.....	.....	.....	.....	17.35	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Death rate per 1000 for county, exclusive of cities of over 5000.	.....	.....	.....	.....	.....	.....	.....	.....	13.33	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	800	461	286	1,130	613	5	3,295	.....	.....	67	190	.....	43	7	15	172	384	511	413	303	163	110	239	16	143	76	7	39

Return of Deaths from all Causes and certain specified Diseases, in the Statistical Divisions of the State of New Jersey, for the year ending June 30th, 1880.

County of GLOUCESTER. Population.....25,886. Statistical Divisions.	DEATHS AT ALL AGES.							Population, census of 1880.	Death rate per 1000.	PRINCIPAL CAUSES OF DEATH.																		
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.			Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croupand Diphtheria.	Diarrhœal diseases.	Consumption.	Acute Lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult Brain and Spinal diseases.	Erysipelas.	Digestive and Intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.
Clayton	8	8	2	7	9	.....	34	1,981	.....	.....	1	.....	.....	.....	.....	5	5	7	5	1	.....	.....	2	.....	3	1	.....	.....
Deptford	3	2	1	8	8	.....	22	1,520	.....	2	.....	.....	.....	.....	.....	.....	1	1	5	1	.....	1	1	.....	3	.....	.....	.....
Franklin	11	8	2	5	8	.....	34	2,480	.....	.....	.....	.....	.....	.....	.....	5	4	3	5	1	3	1	3	.....	1	.....	.....	.....
Glassboro	17	3	4	4	2	.....	30	2,088	.....	.....	1	.....	3	.....	.....	4	6	3	4	3	2	.....	.....	1	1	.....	.....	.....
Greenwich	7	6	5	15	17	2	52	2,598	.....	1	2	.....	1	.....	1	1	5	5	3	3	6	1	7	.....	.....	1	1	.....
Harrison	3	1	.....	11	12	.....	27	2,841	.....	.....	3	.....	.....	.....	1	.....	.....	2	3	.....	3	.....	3	.....	6	1	.....	.....
Logan	5	3	2	2	7	.....	19	1,765	.....	.....	.....	.....	1	.....	.....	1	.....	3	3	.....	.....	1	.....	.....	1	2	1	.....
Mantua	7	3	2	5	5	1	23	1,718	.....	.....	2	.....	.....	1	.....	1	1	.....	.....	.....	2	2	3	.....	4	.....	.....	.....
Monroe	9	6	3	11	6	.....	35	1,858	.....	.....	2	.....	.....	.....	.....	2	7	7	5	4	2	.....	1	.....	3	.....	.....	.....
Washington	7	1	2	6	2	.....	18	1,366	.....	.....	.....	.....	.....	.....	.....	.....	4	3	2	.....	1	.....	1	.....	4	.....	.....	.....
West Deptford	3	3	5	8	6	1	26	1,399	.....	3	.....	.....	.....	.....	.....	.....	2	.....	1	3	2	.....	4	.....	2	1	2	.....
Woodbury	9	1	3	9	5	.....	27	2,298	.....	.....	1	.....	.....	.....	.....	1	2	3	4	2	.....	1	2	.....	1	1	.....	.....
Woolwich	2	2	1	12	11	.....	28	1,974	.....	.....	1	.....	.....	.....	.....	1	.....	8	1	1	4	2	1	.....	4	.....	.....	.....
Death rate per 1000 for county	.....	.....	.....	.....	.....	.....	.....	.....	14.48	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	91	47	33	103	98	4	375	.....	.....	6	13	.....	7	1	2	21	35	45	39	19	25	9	28	1	33	7	3	2

Return of Deaths from all Causes and certain specified Diseases, in the Statistical Divisions of the State of New Jersey, for the year ending June 30th, 1880.

County of HUDSON. Population.....187,950. Statistical Divisions.	DEATHS AT ALL AGES.									PRINCIPAL CAUSES OF DEATH.																			
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.	Population, census of 1880.	Death rate per 1000.	Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhœal diseases.	Consumption.	Acute Lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult Brain and Spinal diseases.	Erysipelas.	Digestive and Intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.	
Bayonne	37	33	2	53	16	.....	141	9,372	15.04	1	.....	.....	3	.....	2	10	19	22	14	16	5	1	5	1	6	3	.....	2	
Guttenberg	9	4	1	10	3	.....	27	1,206	.....	1	1	.....	.....	.....	.....	.....	7	1	3	2	2	1	2	.....	.....	1	.....	.....	
Harrison	30	17	14	53	13	2	129	5,510	23.41	7	2	.....	1	1	.....	.....	11	20	19	12	6	3	6	.....	5	2	2	2	
Hoboken	208	150	64	244	68	.....	734	30,999	23.71	5	2	.....	23	5	6	49	107	76	93	192	37	27	28	7	29	12	3	13	
Jersey City	644	525	267	798	295	4	2,533	120,728	20.98	57	31	.....	148	23	16	164	292	344	269	265	114	66	109	12	101	35	8	31	
Kearney	2	3	4	10	5	.....	24	2,165	.....	1	.....	.....	.....	.....	.....	.....	1	2	6	3	1	.....	.....	.....	2	3	.....	.....	
North Bergen	26	13	17	52	45	1	164	4,268	.....	6	2	.....	8	2	.....	.....	19	29	16	8	5	2	17	2	9	4	.....	1	
Town of Union	36	41	17	23	14	.....	121	5,849	20.68	4	2	.....	17	3	.....	5	14	12	9	14	4	3	7	.....	4	2	.....	1	
Union	5	4	7	7	3	.....	29	1,310	.....	.....	1	.....	5	.....	.....	3	4	4	5	1	.....	2	1	.....	.....	.....	.....	.....	
Weehawken	7	8	6	12	2	.....	35	1,102	.....	3	.....	.....	3	.....	1	2	3	7	6	3	1	.....	1	.....	.....	.....	.....	.....	
West Hoboken	27	14	8	25	14	.....	88	5,441	16.17	1	2	.....	3	.....	1	4	9	7	8	16	8	1	1	.....	6	3	1	1	
Death rate per 1000 of county	.....	.....	.....	.....	.....	.....	.....	.....	21.41	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Death rate per 1000 of county, exclusive of cities	.....	.....	.....	.....	.....	.....	.....	.....	23.68	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
	1,034	812	407	1,287	478	7	4,025	.....	.....	86	50	.....	211	34	25	237	486	516	448	532	183	114	177	22	162	67	12	54	

County of HUNTERDON.

Population..... 38,566

Statistical Divisions.

	DEATHS AT ALL AGES.							Population, census, of 1880.	Death rate per 1000.	PRINCIPAL CAUSES OF DEATH.																				
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.			Remittent fever, etc.	Typhoid fever	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhœal diseases.	Consumption.	Acute Lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult Brain and Spinal diseases.	Erysipelas.	Digestive and Intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.
Alexandria	3	1	1	4	9		17	1,794			2		11				1	1	1				4		1	2		
Bethlehem	4	6	1	15	12		45	2,650			3		1			1	1	1	1				5	1	1			
Clinton Township	3	1		2	5		11	2,133																		1		
Clinton Borough	2		1	4	5	1	13	842																				
Delaware	6	3	1	10	12		32	3,092			2		3			1	1	1	1		1		4		1	1	1	
East Amwell	7	3	2	10	10	1	33	1,696		1													3					
Franklin	5	1	2	5	6		19	1,338															4					
Frenchtown	1	1	1	5	5		13	1,039															1					
High Bridge	4	1	2	5	6		18	2,209															1					
Holland	3	2	2	10	5		22	1,840					5		1				1				4					
Kingwood	2	2	2	5	6		17	1,694															1					
Lambertville	13	9	2	18	8		50	4,183								19												
Lebanon		6	1	17	13	2	39	2,699			2						2	1	1				2		1	1		
Raritan	1	2	1	4	17		25	4,146			1																	
Readington	1	2	1	4	15		23	3,103							1								1			1		
Tewksbury	1	1	2	3	18		25	2,108																				
Union	1	1	1	3	7		13	1,167					1										1					
West Amwell	1	5		4	5		15	1,039								4	1		1				1		1			
Death rate per 1000 for county	75	62	51	134	158	5	475		12.31	2	14	8	6	4	36	39	67	43	11	43	8	64	2	29	13	3	3	

Return of Deaths from all Causes and certain specified Diseases, in the Statistical Divisions of the State of New Jersey, for the year ending June 30th, 1880.

County of MERCER. Population.....58,058. Statistical Divisions.	DEATHS AT ALL AGES.									PRINCIPAL CAUSES OF DEATH.																			
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.	Population, census of 1880.	Death rate per 1000.	Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croupand Diphtheria.	Diarrhœal diseases.	Consumption.	Acute Lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult Brain and Spinal diseases.	Erysipelas.	Digestive and Intestinal diseaseases.	Cancer.	Acute Rheumatism.	Puerperal.
Chambersburg	25	14	19	38	9	4	109	5,437	20.04	.....	5	.....	14	1	2	2	9	17	12	7	3	.....	6	1	7	2	.....	1
East Windsor	8	6	1	4	16	.....	35	2,271	.....	.....	.....	.....	.....	.....	1	1	3	5	5	1	1	.....	1	2	4	.....	1	1
Ewing	.....	1	.....	20	9	.....	30	2,412	.....	.....	.....	.....	.....	.....	.....	.....	.....	4	2	.....	3	.....	†16	.....	3	.....	.....	.....
Hamilton	7	3	7	22	14	1	54	3,370	.....	.....	1	.....	.....	.....	.....	.....	7	13	5	3	4	2	3	.....	5	1	.....	2
Hopewell	6	3	3	13	15	1	41	4,462	.....	.....	.....	.....	.....	.....	1	.....	2	6	.....	1	2	1	2	.....	3	1	.....	1
Lawrence	11	6	2	12	14	2	47	3,171	.....	.....	1	.....	6	.....	.....	.....	4	7	6	6	3	1	2	.....	4	.....	.....	.....
Princeton	20	9	10	16	26	.....	81	4,348	.....	.....	7	.....	2	1	.....	2	10	8	11	5	6	.....	6	.....	6	1	.....	1
Trenton	138	75	75	196	118	16	618	29,910	20.66	5	5	.....	66	1	2	6	54	108	43	40	31	16	28	3	33	11	2	7
Washington	2	1	2	5	8	.....	18	1,281	.....	.....	.....	.....	.....	.....	1	1	.....	3	1	.....	.....	1	3	.....	.....	2	.....	.....
West Windsor	2	2	.....	5	6	.....	15	1,396	.....	.....	.....	.....	.....	.....	.....	1	2	3	.....	.....	.....	2	3	.....	.....	.....	.....	.....
Death rate per 1000 of county	.....	.....	.....	.....	.....	.....	.....	.....	18.05	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Death rate per 1000 of county, exclusive of cities over 5000	.....	.....	.....	.....	.....	.....	.....	.....	14.13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	219	120	119	331	235	24	1,048	.....	.....	5	19	.....	88	3	7	13	91	174	85	65	53	23	87	6	72	20	3	13

†Excess of adult brain deaths in Ewing belongs to asylum.

Return of Deaths from all Causes and certain specified Diseases, in the Statistical Divisions of the State of New Jersey, for the year ending June 30th, 1880.

County of MIDDLESEX. Population.....52,286. Statistical Divisions.	DEATHS AT ALL AGES.									PRINCIPAL CAUSES OF DEATH.																				
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.	Population, census of 1880.	Death rate per 1000.	Remittent fever, etc.	Typhoid fever	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhœal diseases.	Consumption.	Acute Lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult Brain and Spinal diseases.	Erysipelas.	Digestive and Intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.
Cranbury	4	3	2	11	8	.....	28	1,599	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
East Brunswick	9	7	5	15	12	.....	48	3,272	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Madison	4	5	2	6	8	.....	25	1,662	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Monroe	6	5	4	15	13	1	44	3,016	.....	1	.....	.....	1	.....	1	3	1	11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
New Brunswick	23	32	24	65	55	.....	269	17,167	15.66	2	6	.....	1	6	.....	8	45	36	27	24	14	9	17	4	13	11	.....	1
North Brunswick	5	1	2	6	6	.....	20	1,251	.....	.....	1	.....	.....	.....	.....	.....	1	4	2	2	2	.....	4	.....	.....	.....	.....	.....	.....
Perth Amboy	29	8	5	22	18	1	83	4,808	.....	1	1	.....	1	.....	.....	2	14	6	12	7	4	1	6	.....	6	1	.....	.....
Piscataway	5	5	3	17	15	1	46	3,242	.....	1	1	.....	.....	.....	1	.....	3	9	2	2	1	3	2	.....	3	.....	.....	.....
Raritan	11	1	4	12	18	.....	46	3,739	.....	1	.....	.....	.....	.....	.....	1	1	7	4	1	3	1	4	1	2	.....	.....	.....
Sayreville	5	3	7	7	4	.....	26	1,930	.....	2	.....	.....	.....	.....	.....	7	1	.....	1	1	.....	1	.....	.....	.....	1	.....	.....	.....
South Amboy	9	13	6	17	6	1	52	3,648	.....	3	.....	.....	.....	.....	.....	9	6	5	6	1	3	5	2	.....	1	.....	.....	.....	.....
South Brunswick	8	9	4	12	16	.....	49	2,803	.....	1	.....	.....	3	.....	.....	3	6	6	4	3	.....	1	6	1	1	.....	.....	.....	1
Woodbridge	13	4	7	8	12	.....	44	4,099	.....	2	.....	.....	.....	.....	.....	.....	5	3	8	2	3	.....	5	.....	.....	.....	.....	.....	.....
Death rate per 1000 of county	.....	.....	.....	.....	.....	.....	.....	.....	14.86	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Death rate per 1000 of county, exclusive of cities of over 5000	.....	.....	.....	.....	.....	.....	.....	.....	14.46	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	201	93	75	213	191	4	777	.....	.....	16	11	.....	8	6	2	36	87	102	83	47	37	25	54	6	38	23	1	5

Return of Deaths from all Causes and certain specified Diseases, in the Statistical Divisions of the State of New Jersey, for the year ending June 30th, 1880.

County of MONMOUTH. Population.....55,535 Statistical Divisions.	DEATHS AT ALL AGES.									PRINCIPAL CAUSES OF DEATH.																				
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.	Population, census of 1880.	Death rate per 1000.	Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough	Croup and Diphtheria.	Diarrhœal diseases.	Consumption.	Acute Lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult Brain and Spinal diseases.	Erysipelas.	Digestive and Intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.
Atlantic	3			1	2		6	1,743			1									2	1				1				
Eatontown	10	3	3	10	15		41	2,637								1	5	10	3	1	2		4		5				
Freehold	22	9	5	17	12	2	67	4,302					1		1	1	5	11	3	5	2		3		11		1	3	
Holmdell	2	1	2	3	5		13	1,575									1	2		2	1		1		1	1			
Howell	14	4	2	14	9	1	44	3,374			1					1	7	6	6	3	1	2	3		3	1		3	
Manalapan	7	4	1	9	13		34	2,117			1						2	8	2		1	2	2		2				
Marlboro	11		1	6	9		27	2,193					1				4	5	1	3		1	1		1				
Matawan	13	8	2	10	14	1	48	2,699			1					1	6	10	4	5	4	1	1		1	1		1	
Middletown	17	1	10	13	21		62	5,059								5	11	11	3		3	1	3		7	2		1	
Millstone	10	3	2	8	11		34	2,080							1	1	8	3	3	4	2		2		4	1		1	
Neptune	18	19	4	15	5	2	63	4,187					2			5	22	7	2	5	3	1	1	1	4	2			
Ocean	24	6	7	28	17	1	83	6,027			1				1		7	13	4	7	4	7	8	1	1				
Raritan	19	9	3	16	13	1	61	3,891			2		1		1	2	12	11	2	6	2	4	2		2	1	1	2	
Shrewsbury	20	10	5	14	24		73	6,526					1		1	1	9	8	5	6	5	1	9		5	4		2	
Upper Freehold	3	3	4	20	17	2	49	3,236										10	3	3	1				4	2			
Wall	17	7	5	9	9		47	3,829		1	1					4	3	7	3	5	2		5		4			1	
Death rate per 1000 of county									13.54																				
	195	87	56	193	206	15	752			1	8		6		5	22	102	128	44	57	42	24	58	2	56	15	2	15	

Return of Deaths from all Causes and certain specified Diseases, in the Statistical Divisions of the State of New Jersey, for the year ending June 30th, 1880.

County of MORRIS. Population.....50,867. Statistical Divisions.	DEATHS AT ALL AGES.							Population, census of 1880.	Death rate per 1000.	PRINCIPAL CAUSES OF DEATH.																		
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.			Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhœal diseases.	Consumption.	Acute Lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult Brain and Spinal diseases.	Erysipelas.	Digestive and Intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.
Boonton	5	6	4	13	14	1	43	2,685		1			1				4	6	6							1		
Chatham	19	8	5	19	23		74	4,277		1	3				5	1		12	8									1
Chester	3		1	13	4		23	2,337		1	1							5			1				1		
Hanover	10		1	5	21	4	41	4,138						1			4	4	6		2				1		
Jefferson	4	1	6	9	5	2	27	1,793									2	6	5								
Mendham	1	3		5	12		21	1,526							1			1	2		4	1		1			1
Montville	3			3	4		10	1,270									1	1			1						
Morristown	22	11	6	52	36	1	128	6,838	18.71							4	17	19	9		6	6	5	†34		5	3	1	
Mount Olive	6	3		11	5	1	26	1,982		3	1						4	4	1		1	2	1					
Passaic	5	1	1	2	7		16	1,896								2	4		1		1						
Pequannock	5	6	3	6	6	1	27	2,239								4		1	1		1						1
Randolph	24	22	8	34	16		108	7,701					4	6	1	5	9	12	14		9	7						
Rockaway	22	16	9	23	19	1	90	7,366		4			3	3		1	10	8	25		6	2	1					
Roxbury	6	5	6	11	5		33	2,139			1					1	2	3	7		2	3	1		1		1	
Washington	4		2	4	8		18	2,681					1				1	2	4		1	2						1
Death rate per 1000 of county									13.26																			
Death rate per 1000 of county exclusive of cities over 5000									12.65																			
	143	86	52	210	185	9	685			20	10		10	10	7	18	60	87	91	43	42	21	80	4	40	20	4	14

† Eight at asylum of adult brain disease.

Return of Deaths from all Causes and certain specified Diseases, in the Statistical Divisions of the State of New Jersey, for the year ending June 30th, 1880.

County of OCEAN. Population.....14,455. Statistical Divisions.	DEATHS AT ALL AGES.							Population, census of 1880.	Death rate per 1000.	PRINCIPAL CAUSES OF DEATH.																		
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.			Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhœal diseases.	Consumption.	Acute Lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult Brain and Spinal diseases.	Erysipelas.	Digestive and Intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.
Berkley	4	1		3	4		12	683									1	1	1									
Brick	6	5	4	14	13		42	2,090			1					2	1	12	5	2	1	1	6	2	4		1	1
Dover	1	3	5	8	7		24	2,439		1	1					1	2	5		1			3		1	1		
Eaglewood	1			3	3		7	592									1	2							1	1		
Jackson	7	1	1	5	5		19	1,803			1					2	1	2	1	1	1		3		2			1
Lacey	2			1	3	1	7	814							1			1			1				1	1		
Manchester	4	1	1	2	3		11	1,057									2		2	1								
Ocean	1			2			3	484			1						1											
Plumsted	1	2	1	8	4		16	1,561							1			4		1	1		2					
Stafford	2	1		1	4		8	1,008							2			1	1		1		1					
Union	4	2	2	3	2		13	1,024									3	2	1	1			1			1		
Death rate per 1000 of county									11.20																			
	33	16	14	50	48	1	102			1	4		1		4	6	12	28	11	6	6	1	17	2	13	5	2	2

24

County of
PASSAIC.
Population.....68,716.
Statistical Divisions.

DEATHS AT ALL AGES.

	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.	Population, census of 1880.	Death rate per 1000.
Acquacknock	1	1	3	7	6	....	28	1,731	....
Little Falls	6	1	2	14	8	....	31	1,414	....
Manchester	2	1	4	5	1	2	15	1,513	....
Passaic City	45	36	13	44	14	2	142	6,532	21.73
Paterson	305	241	152	286	170	4	1,158	50,487	23.07
Pompton	7	3	2	4	5	....	21	2,251	....
Wayne	4	3	4	6	5	....	22	1,757	....
West Milford	9	6	2	0	11	....	27	2,501	21.56
Death rate per 1000 of county	....	....	....	....	....	....	....	....	13.44
Death rate per 1000 of county exclusive of cities over 5000	....	....	....	....	....	....	....	....	....
	377	288	182	365	220	6	1,408	....	....

PRINCIPAL CAUSES OF DEATH.

	Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhœal diseases.	Consumption.	Acute Lung diseases.	Brain and nervous diseases of children.	Disease of heart and circulation.	Urinary diseases.	Adult Brain and Spinal diseases.	Erysipelas.	Digestive and Intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.
Acquacknock	1	....	....	....	....	....	....	1	1	1	....	....	....	....	....	....	1	....	1
Little Falls	2	....	....	....	....	....	....	....	1	2	2	....	1	3	1	1	....	....	1
Manchester	....	....	....	....	....	....	1	....	1	1	....	....	....	....	1	1	....	....	....
Passaic City	1	7	....	1	....	....	10	22	11	13	22	6	1	3	3	6	1	2	4
Paterson	2	20	....	82	2	11	50	202	152	119	101	46	24	62	3	37	22	2	12
Pompton	....	....	....	....	....	....	....	2	4	4	3	2	1	....	1	3	....	....	....
Wayne	....	....	....	....	....	....	2	1	2	2	6	1	2	1	....	3	2	1	1
West Milford	....	....	....	....	....	....	....	6	2	3	3	2	....	....	....	....	....	....	....
Death rate per 1000 of county	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Death rate per 1000 of county exclusive of cities over 5000	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
	12	22	....	85	22	11	70	238	180	140	137	64	32	72	11	56	28	8	19

County of
SALEM.
Population.....24,550.
Statistical Divisions.

| | DEATHS AT ALL AGES. | | | | | | | PRINCIPAL CAUSES OF DEATH. | | | | | | |

County of SOMERSET.

Population.....27,161.

Statistical Divisions.

| | DEATHS AT ALL AGES. | | | | | | | | PRINCIPAL CAUSES OF DEATH. | | | | | | | |

County of SUSSEX.

Population.....23,553.

Statistical Divisions.

	DEATHS AT ALL AGES.							PRINCIPAL CAUSES OF DEATH.																								
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.	Population, census of 1880.	Death rate per 1000.	Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhœal diseases.	Consumption.	cute Lung diseases.	Brain and nervous diseases of children.	Diseases of heart and circulation.	Urinary diseases.	Adult Brain and Spinal diseases.	Erysipelas.	Digestive and Intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.
Andover	1	1	1	2	2	.....	8	1,150	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Byram	3	5	4	4	1	.....	17	1,406	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Frankford	2	1	2	3	2	.....	10	1,060	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Greene	2	1	1	2	2	.....	8	747	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hardyston	3	1	2	3	2	.....	11	2,645	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hampton	2	1	1	3	2	.....	9	803	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lafayette	1	1	1	4	0	.....	7	780	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Montague	3	3	2	3	4	1	16	1,022	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Newton	3	4	4	8	8	3	30	2,513	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sandyston	2	2	2	2	2	.....	10	1,193	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sparta	3	3	3	6	3	1	19	2,274	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Stillwater	2	2	2	5	1	.....	14	1,502	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Vernon	1	2	1	1	0	.....	5	1,828	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Walpack	.....	.....	.....	.....	1	.....	1	575	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wantage	4	4	2	1	13	.....	42	3,361	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Death rate per 1000 of county	39	30	30	81	92	3	294	.....	12.05	7	12	.....	15	.....	.....	8	11	38	37	21	15	6	35	1	12	6	2	5

County of
UNION.
Population.....55,871.
Statistical Divisions.

| | DEATHS AT ALL AGES. | | | | | | | PRINCIPAL CAUSES OF DEATH | | | | | | |

County of WARREN. Population..... 36,588. Statistical Divisions.	DEATHS AT ALL AGES.							Population, census of 1880.	Death rate per 1000.	PRINCIPAL CAUSES OF DEATH.																		
	Under one.	One to five.	Five to twenty.	Twenty to sixty.	Over sixty.	Undefined.	Total.			Remittent fever, etc.	Typhoid fever.	Small-pox.	Scarlet fever.	Measles.	Whooping cough.	Croup and Diphtheria.	Diarrhoeal diseases.	Consumption.	Acute Lung diseases.	Brain and nervous diseases of children	Diseases of heart and circulation.	Urinary diseases.	Adult Brain and Spinal diseases.	Erysipelas.	Digestive and Intestinal diseases.	Cancer.	Acute Rheumatism.	Puerperal.
Allamuchy	1				1		6	648										3		1			1				
Belvidere		6	1	11	5	1	31	1,773			1			1	2	1	4	6	1	2	1	2				1	
Blairstown		1	1	4	3	1	12	1,458							1		1		1		1	3					
Franklin	4	4		4	6		20	1,529			2		1			1	2	1	1	3							
Frelinghuysen	2		1	3	5	1	14	1,042			1						2		1	3	1	1	1				
Greenwich	11	17	2	11	11		52	2,554		1			5	1		6	4	10	4	2		4		1			1
Hackettstown	3	6	1	11	7	1	29	2,502								1	4	3	9	3	1	2					1
Hardwick					5		7	583											2		1	1		2			
Harmony	2	1	1	3	4	1	12	1,350					1					3				1		2		1	
Hope	5	2	2	5	6		20	1,570					1				1	5	4	2	1	1					
Independence		2	1	7	2		12	1,018			2								1	4	1	1		2			1
Knowlton	2		1	8	6		19	1,476									1	1	2	2	1	1		3			
Lopatcong	3	7	2	5	4	1	22	1,591			1		5			1		5			1	3		1			
Mansfield	9	3	1	7	8	1	29	1,709			1				1	3	4	3	1	2	3	3		1			
Oxford	21	16	7	19	14	1	78	4,593		2	6		2		3	13	5	7	5	3	1	1		6	1		
Pahaquarry	2		1	1			4	418									1	1	1								
Phillipsburg	39	25	21	21	20		126	7,180	17.54		2		15		3	11	9	11	6	22	3	2	10	10	1		1
Borough of Washington	4	3	3	11	6	1	28	2,142		1						2	2	6	3		2	1	2	1	1			2
Washington Township	3			4	4		11	1,452										3	1	1	2		1					1
Death rate per 1000 of county									14.54																		
Death rate per 1000 of county, exclusive of cities of over 5000									13.80																		
	120	97	50	139	117	9	532			4	16		30		5	21	41	50	56	61	30	16	38	2	37	6	2	7

INDEX.

GENERAL INDEX TO SUBJECTS.

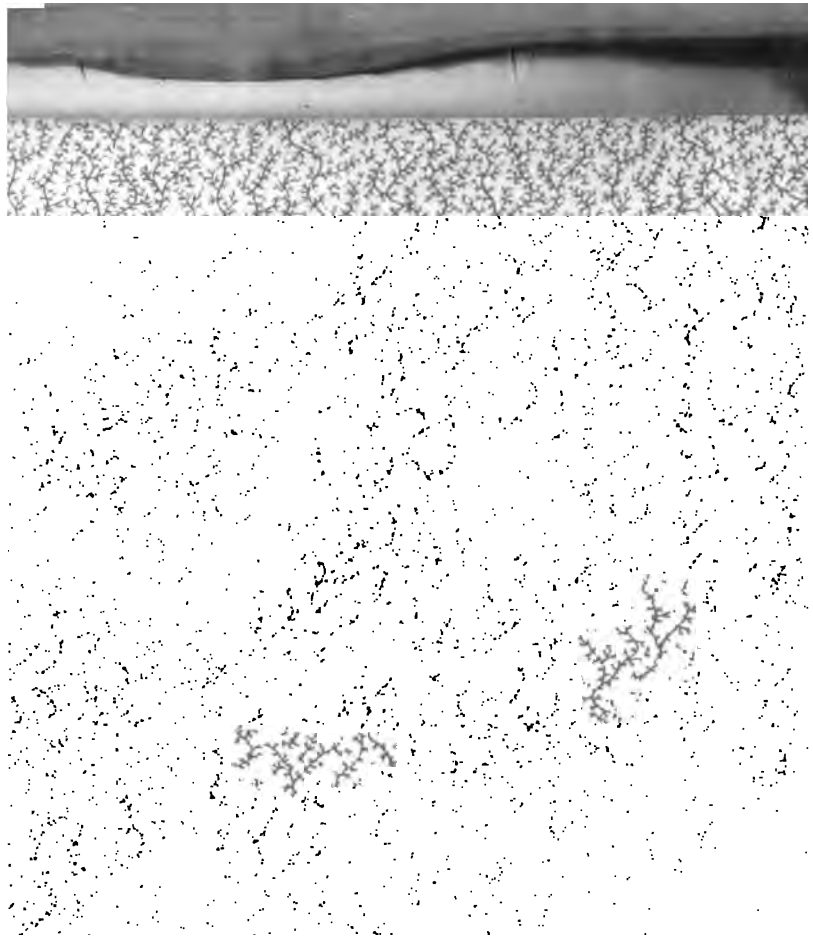
	Page.
Secretary's Report	5—45
Sanitary Survey of parts of Hudson County, Spielman & Brush and Brush & Eddy	47—56
Quarantine Sanitary Defenses, Elisha Harris, M. D., Secretary N. Y. State Board of Health	57—64
Enteric Fever at Princeton, Ezra M. Hunt, M. D	65—87
Sanitary Inquiry into Alms-houses and Jails, Wm. M. Baird, M. D	89—111
Local Health Boards, H. A. Hopper, M. D., President of W. J. Sanitary Association	113—118
Secretary's Summary of Reports from Local Boards	119—183
Subsoil Drainage, Ashbel Welsh, C. E	185—196
Meteorological Tables, Hon. Wm. A. Whitehead and others	195—207
Our Milk Supply, Wm. K. Newton, M. D., State Milk Inspector.	209—235
Contagious Pleuro-pneumonia, Ezra M. Hunt, M. D	236—247
Reports of Veterinary Inspectors, Messrs. Miller, Dyer and McLaughlin (D. V. S.)	249—254
Various Circulars issued by the Board	255—310
Report of the Bureau of Vital Statistics, E. M. Hunt, M. D., Medical Superintendent	311—374
The Census of 1880 as bearing on Questions of Population	312—320
Annual Summary of Vital Statistics, from July 1, 1879, to July 1, 1880	321—338
Various Tables as to Marriages, Births and Deaths	339—349
Returns of Death from All Causes for the Year ending June 30, 1880	350—374

ALPHABETICAL INDEX.

Page.

Acts as to Health, Vital Statistics, etc..... 268, 304
Adulterations of Milk..... 212
Alcohol..... 109
Almshouse..... 32, 89, 100, 127, 144
Animals, Diseases of..... 43, 284, 287
Appliances, Sanitary..... 41, 265
Associations, Sanitary..... 30
Baird, Wm. M., M. D..... 28, 89
Battery..... 259
Baldwin, H. R., M. D..... 131
Bathing and Bathing Houses..... 128, 255
Bayonne..... 52
Bellville..... 16
Births..... 339
Blackwoodtown..... 149
Boards of Health, Local..... 28, 113, 117, 179
Bound Brook..... 17—20, 172
Brush, J. Mortimer, M. D..... 52
Camden..... 24
Cancer..... 337
Census of 1880..... 313
Circulars..... 255
Climatology..... 41, 83, 194
Climate for Invalids..... 43
Cornwall, H. B. Prof..... 27
Consumption..... 335
Contagious, Pleuro-Pneumonia..... 236
Contagion through Milk..... 229
Crime, cause of..... 97
Croup..... 334
Deaths..... 339, 350
Defences, Sanitary..... 57
Diarrhœal Diseases..... 235
Diphtheria..... 7—13, 336
Diplomas, False..... 40
Diseases of Animals..... 43, 284, 287
Disinfectants..... 262
Drainage..... 33, 71, 149, 184
Drains and Sewers..... 191

Page.
Drowning, Rescue in 38, 255
Eddy, Wm. E., C. E..... 52
Elizabeth 21, 30
Epidemics, Local..... 13
Epizootic..... 158
Excreta.....125, 160, 163, 170
Exhibit, Sanitary..... 41, 265
Exotic Diseases..... 61
Explanation of Laws..... 272
Explosions..... 25
Fevers, Enteric..... 65, 145, 183
Malarial..... 13—16, 150, 157, 159, 164, 166, 168, 174, 183
Periodic..... 14, 168, 183, 331
Scarlet..... 333
Typhoid..... 13, 65, 145, 151, 183, 332
Typhus..... 181, 183
Filling of Fronts..... 56
Food of Cattle..... 168
Fowl Cholera 45, 137, 177
Geological Structure, Princeton..... 86
Glanders..... 45
Grave-yards 170
Harris, Elisha, M. D..... 32, 57
Health Boards..... 113—119, 179
Heating..... 71
Hilton, J. S., C. E..... 199
Hopper, H. A., M. D..... 114
Household Circular..... 260
Jails..... 32, 89
Janeway, E. G., M. D..... 78
Kerosene..... 25—28
Laws..... 230, 268
Local Boards..... 28, 113, 118, 179, 281
Local Epidemics..... 13
Malaria..... 139. 166
Marriages..... 339
Maps, Sanitary..... 31
Measles..... 334
Medical Practice, Regulation of..... 39
Meteorology..... 41, 83, 196, 328
Milk Supply..... 41, 209, 297, 224
New Jersey Sanitary Association..... 30
Newton, W. K., M. D..... 45, 209
Nuisances..... 21
Penitentiary..... 95
Periodic Fevers..... 14, 168, 183, 331
Pleuro-pneumonia..... 45, 176, 238

	Page.
Prevention	61
Princeton	65, 82
Population of Cities	315—320
Poor Houses	100—107
Peurperal Fever	337
Quarantine	57
Refuse, Disposal of	125, 146, 165
Resorts, Sea-side	34
Report of Secretary	5
Reports of Veterinary Inspectors	249, 254
Rescue of Drowning	38, 255
Reservoir Princeton	70
Sanitary Exhibit	41, 265
Schools	127
Schedule of Inquiry	274, 305
Secretary, Report of	5
Sewers and Drains	191
Sea-side Resorts	34
Sewage	36
Sewerage	72, 96, 141, 149, 156
Small-pox	24, 147, 153, 301, 333
State Board of Health, Members of	3
Statistics, Vital	300, 322, 339
Spielmann & Brush	47
Subsoil Drainage	184
Suggestions to Health Board	179
Survey, Hudson Co	31, 47
Summary of Vital Statistics	349
Swine Fever	45, 177
Syringe Hypodermic	259
Tables, Meteorological	197, 199
Tests of Milk	219
Tobacco	138
Township Health Book	274
Typhoid Fever	13, 65, 145, 151, 183, 332
Typhus Fever	181, 183
Uses of Statistics	326
Ventilation	71, 97
Vital Statistics	300, 322, 339
Water Carriage	72
Water Fronts	56
Water Supply	36, 69, 96
Weather	41, 83
Welch, Ashbel C. E.	184
Wet Dying Association	30
Whitehead, Wm. A	197
Yearly Outline of Vital Statistics	322
Zeh, C. M., M. D.	[illegible]

[redacted]